The Reporter 2008

Food Protection Program ◆ Bureau of Environmental Health

Massachusetts Department of Public Health

In this Issue:

Food Protection Program

The Reporter

Joan L. Gancarski, Editor
Food Protection Program
Bureau of Environmental Health
Massachusetts Department of Public Health
305 South Street
Jamaica Plain, MA 02130
Phone 617-983-6712 Fax 617-983-6770 TTY 617-624-5286

www.mass.gov/dph/fpp

Letter from the Director: Priscilla J. Neves, RS, CFSP, MEd

This past year has been exciting and challenging as an environmental health professional working in food protection. As many of you are aware, Paul Tierney, the former Director of the Food Protection Program (FPP) retired in May 2006 after several years of service with the Department and the Food Protection Program. I became Acting Director and was subsequently appointed Director the following November. In addition, Tara Harris was appointed as our Foodborne Illness Response Coordinator and Food Safety Specialist, Kim Foley was recently appointed as Assistant Director of Food Safety and Defense, and Alysia Salonia and Steve Rice have joined our team as Senior Food Inspectors. I am also excited to announce that funding has been approved for four additional field and technical staff to support food safety and local board of health retail food programs in MA in response to the recent State Auditor's 2005 Report and local health coalition advocates.

Having worked closely with local boards of health, the MDPH Working Group on Foodborne Illness Control and numerous retail food safety initiatives for the majority of my twenty years in the FPP (formerly Division of Food and Drugs), I have come to appreciate the complexity of our food safety system and the critical interdependence between local boards of health, the Department of Public Health, our sister state and federal food agencies and industry. The United States food regulatory system mirrors the complexity of our food supply system and reminds us of the important role that we all play from farm to table in the prevention of foodborne illness.

As a member of the Bureau for Environmental Health, I was invited last year to participate in a leadership fellowship that provided valuable insight including the importance of establishing values as a program manager. One of the first steps I took as a new manager was establishing a set of values that I believe are critical in delivering essential health services to our stakeholders. Concisely, they are competency (including accountability and professionalism), science-based policies, regulations and procedures, the concept of active managerial control and progressive enforcement practices. In our complex food system, regulatory program failures are often attributed to the lack of knowledge and skills, poor communication, outdated regulations, policies and enforcement protocols, limited industry (and consumers) education and outreach, and ineffective enforcement protocols. To address these and other challenging program issues such as inadequate resources and emergency preparedness, I encourage local and regional health entities to explore the use of performance based standards such as the FDA's Voluntary National Retail Food Regulatory Program Standards to manage local retail food programs. FPP and local jurisdictions in MA including Boston, Danvers, Greenfield, Nahant, Newton and West Springfield have already enrolled in this increasing national trend to evaluate, plan and monitor program improvement.

In our efforts to keep you informed about current food safety and defense issues, we are including some noteworthy articles in the REPORTER:

- Farmer's Markets: FPP Guideline on permitting and safe food handling practices
- Food Labeling: Massachusetts minimum requirements for packaged food labeling
- Environmental Chemistry Laboratory at the State Laboratory Institute: An overview by Julie Nassif, Director of Environmental Chemistry at the SLI of the chemistry analytical testing services and sample collection recommendations for local health departments.
- 2006 Annual Summary of the Working Group on Foodborne Illness Group: Prepared by Division of Epidemiology and Immunization staff.

- Salmonella Heidelberg Outbreak – Investigation report of a Salmonella outbreak associated with dining at a restaurant in Essex County.
- Avian Influenza – Food Safety Issues
- Importing Meat, Poultry and Egg Products – USDA/FSIS (Food Safety Inspection Services) overview of products subject to FSIS Inspection Import Inspection.
- Consumer Publications – Power outage key tips for consumer food safety, safe handling of raw produce and fresh-squeezed fruit and vegetable juices, seniors and food safety, safe food handling practices in the home.
- MA Guide for Safe Handling of Shellfish at Retail – fact sheet for industry and regulators developed by the MA Partnership for Food Safety and Education.

Program Highlights 2006-2007

- FPP, as a member of the MDPH Working Group on Foodborne Illness Control, received approximately 440 complaints involving about 1200 cases. Food purchased in food service establishments were identified in the majority (76 percent) of complaints reported requiring investigations by the local board of health.

- Several new policies and guidelines were developed by the FPP. A complete list of guidance documents currently on-line is now available.

- Massachusetts (local, federal and state) participated in the Conference for Food Protection's pilot on food inspector field training which will eventually be incorporated into FDA's retail program standards. Participants were recognized by MDPH Commissioner John Auerbach; Bureau Director, Suzanne K. Condon; and Food Protection Program Director, Priscilla J. Neves at the 45th Yankee Conference in Plymouth.

- The Massachusetts Coalition for Food Safety and Defense facilitated two training meetings on the FDA's ALERT food defense for retail operations initiative in June, 2006.

- The FPP in conjunction with the SLI participated in a nationwide month-long food defense exercise to test and foster communication with stakeholders involving the collection and shipping of food samples to a federal laboratory following a bioterrorism threat to the food supply.

- FPP in cooperation with the Local Public Health Institute and the Massachusetts Health Officer's Association developed and conducted 4 one-day workshops entitled "Preparing and Responding to Retail Food Emergencies" that was attended by more than 100 local and state food regulators and industry representatives.

- FPP in cooperation with FDA sponsored two Retail Food Program Standard Courses and has officially enrolled in FDA's Voluntary National Retail Food Regulatory Program Standards program.

Looking Ahead…

There are many challenges that lie ahead. Using the program standards and essential health services as a compass has been helpful in identifying key areas that we hope to focus on this year.

- Food Inspector Training - Establishing additional guidance on training and education requirements and recommendations for field inspectors is critical to the integrity and effectiveness of our food safety programs.

- Food Safety and the Sustainable Communities Movement – Supporting the locally grown and harvested food trend is important to ensure a safe and healthy food supply.

- Food and Water Emergencies – Improving our response as well as helping commercial food operations to properly respond during food and water emergencies is essential to food safety and continuity of operations.

- Foodborne illness outbreaks and other food safety system failures– Clarifying our role in investigating outbreaks, responding to food recalls and removing adulterated food from the marketplace to control and prevent foodborne illness outbreaks.

- Electronic Inspection Systems – Securing an electronic inspection system is essential in effectively collecting, analyzing and assessing foodborne illness hazards and interventions in our jurisdictions to determine if our programs are as effective as they can be.

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Farmer's Markets

While there is no regulatory definition for *farmer's markets*, the Massachusetts Department of Agricultural Resources defines them as: "festive outdoor markets where farmers sell their locally grown farm products directly to the consumer." The Massachusetts Department of Public Health's interpretation of farm products currently includes:

- Fresh Produce (fresh uncut fruits and vegetables)
- Unprocessed honey
- Maple syrup
- Farm fresh eggs (must be stored and maintained at 45°F (7.2°C))

Farmer's Market Vendors that Require a Retail Food Permit

Farmer's markets, which traditionally offered locally-grown produce and farm products, have expanded into retail food operations offering processed foods. Farmer's market vendors that sell food products and processed foods other than those products listed above, shall be licensed as a retail food operation and inspected by the local health department in accordance with Massachusetts Regulation 105 CMR 590.000 - Minimum Sanitation Standards for Food Establishments - Chapter X.

Examples of processed foods commonly sold at farmer's markets include pies, cakes, breads, jams and jellies, candy, and baked goods.

While some farmer's markets are organized by a market manager (someone who assists the vendors in the coordination of permitting, as well as assisting with other issues for the market), the Food Protection Program recommends that local health departments issue retail establishment licenses to individual vendors, for enforcement purposes. License fees may be established as either a percentage of the annual fee charged for a regular food establishment permit based on the number of weeks the farmer's market is operating, or the local health department may set a specific permit fee for a farmer's market operation. Whichever fee system and fee the board selects, the fee should not be higher for the seasonal operation than the regular food establishment fee is on an annual basis.

The local health department must assess the facilities available to the farmer's market, and prohibit any food-handling operation that cannot be safely performed. In addition, the local health department may prohibit the sale of certain food items if the items cannot be handled and maintained in accordance with 105 CMR 590.000 requirements.

Finfish and crustaceans may be sold at a farmer's market provided they are sold only from a state-licensed retail truck. (Licensure includes a Division of Marine Fisheries retail seafood truck permit and may include additional permitting by the local health department.)

Safe Food Handling Practices

Physical and Sanitary Facilities

Farmers markets are most often held in an open-air setting, such as a town common or field. In some cases, there may be restrooms and handwashing facilities nearby that vendors may use. If restrooms

and handwashing facilities are not available, the market must provide portable restrooms and handwashing facilities for use by vendors.

If only agricultural products and packaged food items are offered for sale, there is no requirement for handwashing stations at each individual vendor area.

Approved Source
Processed foods sold at a farmer's market must be manufactured in a licensed food processing facility, a licensed food establishment, or a licensed residential kitchen. Copies of residential kitchen permits, retail food establishment permits or food manufacturing licenses at which the food was prepared should be submitted to the local health department along with the vendor's application.

There is no approved source requirement for fresh fruits and vegetables.

The sale of shellfish is prohibited.

Food Samples
If a vendor offers food sampling, the local health department may impose additional handwashing requirements for that vendor. Ready-to-eat food samples should be cut, wrapped and secured in the licensed facility in which they are manufactured, and must be protected from environmental and consumer contamination during transportation and display. Any food handling process involving exposed ready-to-eat foods must be closely evaluated for proper controls and restricted if there is any potential for contamination or growth of pathogenic organisms.

Temperature Control
Any food requiring temperature control for safety must be held at proper temperatures in accordance with 105 CMR 590.000 and federal laws governing those foods during transportation and display for sale.

For additional information:

- on the opening and operating of a farmer's market, contact the Massachusetts Department of Agricultural Resources at 617-626-1754.
- on food safety and sanitation, licensure and city/town requirements, contact the local health department,
- on Massachusetts regulations, contact the Food Protection Program at 617-983-6712.

Retail Sale of Shellfish by Harvesters/Growers

The direct sale of shellfish by a licensed shellfish harvester or grower to retail stores (including restaurants) or to individual consumers is prohibited. A shellfish harvester may only sell shellfish, using an approved transaction card, to a properly licensed wholesale seafood dealer. Harvesters and growers may be granted wholesale seafood dealer permits if they meet the requirements of 105 CMR 533.000 Fish and Fishery Products and the requirement of having a fixed location.

Shucked Shellfish Labeling

The following labeling and product quality standards are required of wholesale dealers licensed as a shucker/packer, producing and marketing shucked shellfish, i.e. any bivalve mollusk, for wholesale and/or retail sale. All information on a container shall be labeled in a legible and indelible form.

Packing for Retail Sale

- All shucked shellfish packaged in containers with a capacity of less than 64 fluid ounces (1/2 gallon) shall be considered as packed for retail sale and shall be labeled with the following:
  - A principle display panel (on the side of the container that is most conspicuous to the consumer at time of purchase) which, at a minimum, shall include:
    - The common and usual name of the product
    - A weight statement, which must appear in the bottom 30% of the panel
      Examples: Net Weight: 0.25 Liquid U.S. Gal. or 0.95L

  - An information panel (the side of the container immediately to the right and contiguous to the principal display panel) which, at a minimum, shall include:
    - A list of ingredients (if others in addition to the product stated)
    - The *Sell-By* or *Best-if-Used*-By date
    - Recommended product storage conditions.
      Example: Keep Refrigerated, (which is required for potentially hazardous foods)
    - The name and address of the packer or distributor
    - The packer's or repacker's state certification/permit number

  - If a health claim is made on the label or salt is added, nutritional labeling may be required.

Packing for Wholesale

- All shucked shellfish packaged in containers with a capacity of 64 fluid ounces (1/2 gallon) or more shall be considered as packed for wholesale and shall be labeled with the following:
  - A principle display panel (on the side of the container that is most conspicuous to the consumer at time of purchase) which at a minimum shall contain:
    - The common and usual name of the product; and
    - A weight statement, which must appear in the bottom 30% of the panel.
      Examples: Net Weight: 1 Liquid U.S. Gallon or 3.79L

  - An information panel (the side of the container immediately to the right and contiguous to the principal display panel) which, at a minimum, shall include:
    - A list of ingredients
    - For shellfish *other than scallops shucked at sea*, the *Date Shucked* and a Lot number;

- The Date Shucked shall consist of the Julian date (the number of the day of the year) or the month and the number of the day of the month, and the production number of the day shucked
  Examples: 85-1 (March 26) or 0326-1 (March 26)

- For frozen shellfish, include the year;
  Examples: 8598-1(March 26, 1998) or 032698-1 (March 26, 1998)

- Appear on the lid and sidewall or bottom of durable containers; or
- Appear on the lid and sidewall of disposable containers.

- Recommended product storage conditions, i.e., "Keep Refrigerated"
- The name and address of the packer or distributor
- The packer's or repacker's state certification/permit number

- Frozen shellfish or scallops shall be labeled as "frozen" in type size of equal prominence to and immediately adjacent to the name of the product, e.g. *Frozen Minced Clams*, *etc.*

- If the dealer thaws and repacks frozen shellfish or scallops, the dealer shall label the product as "previously frozen" and in the same manner as immediately above, e.g. *Previously Frozen Minced Clams*.

- If the product is marketed in various optional forms (whole, sliced, minced, strips, etc.), the particular form shall be a necessary part of the statement of identity. The particular products and their optional forms may, for example, be "group listed" on the container in the following manner and the appropriate product name checked with indelible ink:
  Whole clams ☐
  Minced clams ☐
  Clam strips ☐
  Chopped clams ☐
  Sea Scallops ☐
  Bay Scallops ☐

- The requirement to label product as fresh or frozen may also be labeled on the container in the following manner:
  Fresh clams ☐
  Frozen clams ☐
  Fresh scallops ☐
  Frozen scallops ☐

- *Product found in containers not meeting these labeling requirements may be deemed misbranded and subject to embargo and disposal.*

Massachusetts Minimum Requirements for Packaged-Food Labeling

(NOTE: This article is only a guide. Since regulations are amended from time to time, it is the responsibility of licensees to know and abide by all current labeling regulations. Always consult official Massachusetts and federal regulations to ensure labels are in full compliance.)

The Food Protection Program has prepared this guide to help you develop a food label that complies with Massachusetts and federal labeling requirements**.** For additional information, please refer to the resources listed at the end of this article.

Foods that Require Labeling

All packaged foods must be labeled in accordance with Massachusetts and federal labeling regulations, including all foods intended for retail sale that are manufactured in licensed residential kitchens.

Minimum Information Required on a Food Label

The Massachusetts and federal labeling regulations require the following information on every food label:

- Common or usual name of the product.
- **All** ingredients listed in descending order of predominance by weight, and a complete listing of sub-ingredients. *Example of a sub-ingredient:* Flour (bleached wheat flour, malt barley, flour, niacin, iron, potassium thiamine, thiamine mononitrate, riboflavin).
- Net weight of product.
- Dual declaration of net weight if product weighs one pound or more.

  Example: 1 pound [16 oz]
- "Keep refrigerated" or "Keep frozen" (if product is perishable)
- All perishable or semi-perishable foods require open-dating and recommended storage conditions printed, stamped, or embossed on the retail package.

  Once an open-date has been placed on a product, the date may not be altered.
- Name and address of the manufacturer, packer, or distributor. If the company is not listed in the current edition of the local telephone book under the name printed on the label, the street address must also be included on the label.
- Nutrition labeling.
- If a food product has a standard of identity, the food must meet the standard in order to be offered for sale under that product name.
- All FDA certified colors. *Example:* FD&C Yellow #5, FD&C Red #3

Massachusetts Open-dating Regulation

To comply with the Massachusetts open-dating labeling regulation, a "sell-by" or "best-if-used-by" date is required if the product has a recommended shelf life of fewer than 90 days.

Foods exempt from this requirement include: fresh meat, poultry, fish, fruits, and vegetables offered for sale unpackaged or in containers permitting sensory examination, and food products pre-packaged for retail sale with a net weight of less than 1½ ounces.

Foods may be sold after the open-date if the following conditions are met:

- It is wholesome and good quality.
- The product is segregated from food products that are not "past date," and the product is clearly marked as being "past date."

Health Claims
Heath claims allowed by the FDA on a package label are limited to the following relationships between diet & disease:
1. Calcium & reduced risk of osteoporosis
2. Sodium & increased risk of hypertension
3. Dietary saturated fat and cholesterol & increased risk of coronary heart disease
4. Dietary fat & increased risk of cancer
5. Fiber-containing grain products, fruits, and vegetables & reduced risk of cancer
6. Fruits/vegetables & reduced risk of cancer
7. Fruits, vegetables, and grain products that contain fiber, particularly soluble fiber & reduced risk of coronary heart disease
8. Soluble fiber from certain foods & reduced risk of heart disease
9. Folic acid & reduced risk of neural tube defects
10. Soy proteins & reduced risk of heart disease
11. Stanols/sterols & reduced risk of heart disease
12. Dietary non-cariogenic carbohydrate sweeteners & reduced risk of tooth decay

Food Allergen Labeling
The Food Allergen Labeling and Consumer Protection Act of 2004 (FALCPA) addresses the labeling of foods that contain any of the eight major food allergens.

FALCPA defines "major food allergen" as

MILK	**FISH**	**TREE NUTS**	**PEANUTS**
EGG	**CRUSTACEAN SHELLFISH**	**WHEAT**	**SOYBEANS**

All ingredients that contain a major food allergen must be labeled, regardless if they might otherwise be exempted from labeling by being a spice, flavoring, coloring or incidential additive.

FALCPA requires the labeling of food allergens in one of two ways.
1. In the ingredient statement, include the name of the food source in parentheses following the common or usual name of the major food allergens. For example: Ingredients Flour (**wheat**), whey (**milk**)
2. Following the ingredient statement, place the word, “Contains,” followed by the name of the food source from which the major food allergen is derived. For example: *Contains Wheat, Milk*

FALCPA requires that:
- For Tree Nuts, the specific type of nut must be declared:
  Example: almonds, pecans, walnuts, etc.
- For Fish and Crustacean Shellfish, the species must be declared:
  Example: cod, salmon. lobster, shrimp, etc.

FALCPA's requirements apply to all packaged foods sold in the United States, including both domestically manufactured and imported foods.

Resource Information on Labeling

Principal display panel 105 CMR 520.101 21 CFR 101.0	Information panel 105 CMR 520.102 21 CFR 101.2
Identity labeling of food 105 CMR 520.103 21 CFR 101.3	Nutrition labeling 105 CMR 520.109 21 CFR 101.9
Misbranding of food 105 CMR 520.118 MGL C. 94 sec. 187 21 CFR 101.18	Mandatory labeling information 105 CMR 520.020
Natural and organic labeling 105 CMR 520.116	Trans Fat http://www.cfsan.fda.gov/~dms/transgui.htm
Allergens Food Allergen Labeling and Consumer Protection Act of 2004 (FALCPA) (Public Law 108-282) Guidance for Industry: http://www/cfsan.fda.gov/~dms/alrguid4.html	

For interpretations and assistance with labeling regulations, please contact:

Food Protection Program
Bureau of Environmental Health
Massachusetts Department of Public Health
305 South Street
Jamaica Plain, MA 02130

Phone: 617-983-6712
Fax: 617-983-6770
TTY:617-624-5286
Web: www.mass.gov/dph/fpp

Or the U.S. Food and Drug Administration
http://www.cfsan.fda.gov/label.html
Office of Nutritional Products, Labeling, and Dietary Supplements at 301-436-2371

For a copy of this article on a brochure format, go to
http://www.mass.gov/Eeohhs2/docs/dph/environmental/foodsafety/food_label_brochure.pdf

Herbal/Dietary Supplements

"Dietary supplement" as defined in the Dietary Supplement Health and Education Act (DSHEA) of 1994 is a product taken by mouth that contains a "dietary ingredient" intended to supplement the diet. The "dietary ingredients" in these products may include: vitamins, minerals, herbs or other botanicals, amino acids, and substances such as enzymes, organ tissues, glandulars, and metabolites. Dietary supplements can be extracts or concentrates, and may be found in many forms such as tablets, capsules, softgels, gelcaps, liquids or powders. Whatever the form, DSHEA places dietary supplements in a special category under the umbrella of "food," not drugs, and requires that every supplement be labeled a dietary supplement.

The local board of health has the authority, under 105 CMR 590.00: State Sanitary Code, Chapter X-Minimum Standards for Food Establishments, to permit dietary supplement businesses as the DSHEA places them under the umbrella of foods. Permitting would follow food-manufacturing guidelines as with any other food product. Dietary supplements in general have not been implicated in food borne illness outbreaks and therefore may be considered non-PHF (potentially hazardous food) foods for consideration in limited preparation in residential kitchens. Depending upon the nature of the intended marketing, the residential kitchen may be permitted by either the local board of health if retailing or, if wholesaling is intended, by the Massachusetts Department of Public Health (DPH).

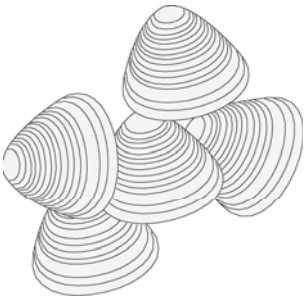
Physical attributes of the manufacturing areas should be similar for any other food products. It is strongly recommended that products be labeled with some type of shelf date or expiration date, which is supported by scientific data or testing. Natural herbs and supplements may lose effectiveness over time. U.S. Food and Drug Administration (FDA) regulations require that dietary supplement labels must include a descriptive name of the product stating that it is a supplement, the name and place of business of the manufacturer, packer, or distributor, a complete list of ingredients, and the net contents of the product. In addition, each dietary supplement (except for eligible small businesses) must have a nutrition label in the form of a "Supplemental Facts" label. This label must identify each dietary ingredient contained in the product.

Another labeling issue regards claims; a dietary supplement cannot promote on its label or in any informational labeling that it is a treatment, a prevention, or a cure for a specific disease or condition. Dietary supplements may make "health related" claims (such as promotes restful sleep, increases energy); the manufacturer is responsible for the validity of these claims. If a dietary supplement makes a "health related" claim, it must state in a "disclaimer" that FDA has not evaluated this claim. It must also state that this product is not intended to "diagnose, treat, cure, or prevent any disease," because only a drug can make such a claim.

In accordance with DSHEA, the manufacturer of all dietary supplements is responsible for the safety of their products. Complaints about dietary supplements, as well as over the counter medications and cosmetics, should be sent to the Food Protection Program who will forward to FDA for follow-up, as FDA is the primary enforcement agency for these products.

A Massachusetts Guide for

SAFE HANDLING OF SHELLFISH AT RETAIL



Molluscan shellfish include fresh and frozen oysters, clams, mussels and scallops. They grow in water that may become contaminated. Therefore, the Massachusetts Division of Marine Fisheries (DMF) and the Massachusetts Department of Public Health (DPH) work together to protect consumers by regulating the harvesting, distribution and handling of shellfish. Because molluscan shellfish are often eaten raw or undercooked, they require special handling except when the scallop product consists only of the shucked adductor muscle. To reduce the risk of foodborne illness caused by eating unsafe molluscan shellfish, follow these food safety practices for shellfish and shellstock (raw, in-shell shellfish). These practices are consistent with Massachusetts Department of Public Health, Food Protection Program regulations 105 CMR 590.000.

PREVENT CROSS CONTAMINATION and PRACTICE GOOD PERSONAL HYGIENE *When handling any food, always*	**CMR 590 REFERENCE**
• Report to the Person-in-Charge if you are feeling ill with symptoms of diarrhea, vomiting, fever, jaundice, sore throat with fever, lesions containing pus on hand, wrist or any exposed body part or if diagnosed with a medical disease that is transmissible through food.	2-201.11 590.003 (C)
• Wash your hands before and after preparing raw seafood products.	2-301.12 & 2-301.14 (G)
• Do not handle ready-to-eat shellfish (shucked, raw ready-to-eat or cooked) with your bare hands.	3-301.11
• Use proper cleaning and sanitizing procedures.	4-6 and 4-7

AT RECEIVING *Check that the*	**CMR 590 REFERENCE**
• Shellstock and shucked shellfish are received under refrigeration and sanitary conditions.	3-202.11 (B)
• Shipment is from a certified interstate shipper or an approved in-state dealer.	3-201.15
• Containers of live shellstock are properly tagged and include the following information: 1. Dealer's name and address and certification number 2. Date of harvesting 3. Identification of the harvest location with the abbreviation of the name of the state or country 4. Type and quantity of shellfish (clams, oysters, mussels and scallops) 5. Statement requiring the tag to be attached to the container until emptied and then retained for 90 days	3-202.18 [A(1 & 2)]
• Containers of shucked shellfish are labeled to show the: 1. Name, address and certification number of shucker packer 2. Common name of product, i.e. clams, oysters, mussels and scallops 3. "Sell by" date on containers less than 1.89 L. (one-half gallon) 4. "Shucked" date on containers of 1.89 L. (one-half gallon) or more	3-202.17 (A)

XYZ Shellfish Co.
23 Seaweed Lane
Chowderville, MA 01003 CERTIFICATION # MA-6543-SS
Original Shipper's Cert. #, if different from Above:
Harvest Date: 1/24/07 Shipping Date: 1/25/07
Harvest Location: Wellspring, MA
Type of Shellfish: Oysters
Quantity of Shellfish: 5 pounds
THIS TAG IS REQUIRED TO BE ATTACHED UNTIL CONTAINER IS EMPTY OR RETAGGED AND THEREAFTER KEPT ON FILE FOR 90 DAYS.

TO:	Reshipper's Cert. No.	Dates Reshipped
Sam's Clam Shack 123 Shoreline Road Milford, CT 07931		

These practices are consistent with Massachusetts regulations 105CMR 590.000 which adopts by reference the federal 1999 Food Code. 3/1/07. This fact sheet was developed by the MA Partnership for Food Safety Education with support from the Massachusetts Environmental Health Association and Massachusetts Health Officers Association in cooperation with the University of Massachusetts Extension Nutrition Education Program. UMass Extension is an equal opportunity provider and employer, United States Department of Agriculture cooperating. Contact your local Extension office for information on disability accommodations or the UMass Extension Director if you have complaints related to discrimination, 413-545-4800.

AT RECEIVING *Accept the product when the*	CMR 590 REFERENCE
• Temperature of shellstock is 7°C (45°F) or less.	3-202.11 (B)
• Temperature of shucked shellfish is 7°C (45°F) or less.	3-202.11 (B)
• Shellstock is reasonably free of mud. Discard dead shellstock and shellstock with badly broken shells.	3-202.19

FOR STORAGE AND DISPLAY *To store and display shellfish*	CMR 590 REFERENCE
• Refrigerate the shellfish immediately after receipt and cool to 5°C (41°F) or less within 4 hours.	3-501.14 (C)
• Hold shellfish during storage and display units at 5°C (41°F) or less.	3-501.16 (B)
• Store shellfish off the floor and stack the containers to allow for good air circulation.	3-305.11
• Separate different species of raw ready-to-eat shellstock during storage and while on display.	3-302.11 (A)(2)(b)
• Separate raw animal foods from cooked ready-to-eat and raw ready-to-eat shellfish during storage and while on display.	3-302.11 (A)(1)(a&b)
• Do not store shellstock below foods that may drip or leak onto the shellstock containers.	3-302.11(A)(2)(b)
• If displayed on ice, it must be drained ice.	3-303.12 (B)

FOR STORAGE AND DISPLAY *About original containers and records*	CMR 590 REFERENCE
• Keep shellstock tags on or with the original container until empty. Once the containers are empty, remove the tags and keep them on file in chronological order for 90 days.	3-203.12
• Keep shucked shellfish in the original container until prepared for service or sold.	3-203.11
• Do not commingle (mix) shellfish from different containers or different species.	3-203.11/12

MONITORING SHELLFISH	CMR 590 REFERENCE
• Periodically check to make sure that the:	
✓ temperature of the shellfish is 5°C (41°F) or less.	3-501.16 (B)
✓ dead shellstock or shellstock with badly broken shells are discarded.	3-202.19
• Rotate shellfish from storage to display using the FIFO (First In, First Out) system based on date of receipt.	recommended

SALES AND SERVICE	CMR 590 REFERENCE
• A "Consumer Advisory" is required at the point of selection in food establishments that sell or serve raw or partially cooked shellfish.	3-603.11
• Make sure that shellstock on display can be identified and that the tags are filed once the containers are emptied.	3-203.12
• Observe proper procedures to prevent contamination of the shellfish.	3-301 through 3-307
• Do not commingle (mix) shellfish from different containers or different species of shellfish.	3-203.11/12

Special Requirement for Molluscan Shellfish Tanks (For Person-In-Charge) A life-support system display tank may be used for storage &/or display of shellstock intended for sale to the consumer if it is a spray-type system, not an immersion-type system, & it is operated & maintained in accordance with a variance & HACCP plan that is approved by the Dept of Public Health & the local Board of Health. The immersion-type system is considered to be wet storage which is not allowed at the retail level in MA & if done at the wholesale level requires a wet storage permit approved by the Dept of Public Health. [MA Food Code 4-204.110; & the National Shellfish Sanitation Program's (NSSP) Model Ordinance].

Environmental Chemistry Laboratory at the State Laboratory Institute

Julianne Nassif, MS, Director of Environmental Chemistry

In many cases of foodborne illness or food product complaints that consumers call in to local health agencies or the Food Protection Program (FPP) at the Department of Public Health (DPH), some of the implicated food is left over. Testing of these samples is often the only way to determine whether this food item actually was the cause of the illness. Foodborne illnesses with a short onset of symptoms, ranging from minutes to a few hours, may have been caused by a chemical rather than bacterial or viral agents.

The Environmental Chemistry Laboratory at the Massachusetts State Laboratory Institute (SLI) analyzes food samples associated with rapid onset illness for a variety of organic and inorganic chemicals. Analytical testing is determined on a case by case-by-case basis and not all food samples are good candidates for testing. Depending on the clinical symptoms, food type and onset time, the laboratory, in consultation with the FPP and local health agents, will determine which, if any, chemical analyses are appropriate. Laboratory staff will advise health agents regarding appropriate sampling containers, storage and transport requirements. If possible, samples should be kept in original containers. Health agents should not bring samples to the laboratory without prior consultation with FPP staff. Samples need to be submitted together with a letter that outlines the chain of custody and lists detailed product information in case a trace back of the food item has to be initiated.

Listed below are examples of some of the testing that is available:

- *Biogenic amines associated with Scombroid Poisoning*
- *Seafood toxins associated with Amnesic Shellfish Poisoning and Paralytic Shellfish Poisoning*
- *Heavy metals*
- *Volatile and semi-volatile organic compounds*
- *Pesticides*
- *Illicit drugs and pharmaceuticals*

If a health agent suspects that one or more individuals became ill within one hour of eating and food is left over, he should call the Food Protection Program at 617-983-6712 to discuss the case and potential testing of the food. For a proper evaluation, details regarding onset, symptom and food history must be provided. Because there are thousands of chemicals that could induce illness upon ingestion, any additional information that could help focus the testing process is helpful. For example, if the complainant noticed an unusual smell or taste associated with the product it too should be noted. Often an inspection of the food service or retail establishment will identify chemicals used in the facility and/or opportunities in the process for contamination. This detail provides the Environmental Chemistry staff the information necessary to develop a testing algorithm for the suspect product.

The analysis of food products for chemical contaminants is challenging. The laboratory uses sophisticated instrumentation such as gas chromatography, gas chromatography/mass spectrometry, high pressure liquid chromatography, atomic absorption spectroscopy, graphite furnace atomic absorption spectroscopy and infrared spectroscopy, that is extremely sensitive to some compounds. It is critical that samples be stored in appropriate containers and held at proper temperature until delivered to the laboratory. Unfortunately, there is no universal protocol for sample collection and transport but laboratory staff will gladly provide guidance on an individual basis.

Chemical constituents inherent in some foods can interfere with the laboratory's ability to detect and measure contaminants, necessitating complex sample clean-up prior to analysis. While most testing is completed in a few days, some analyses can take 1-2 weeks. The laboratory also requires that health agents provide a "control sample." This is a second sample of the same product, which is likely free of contamination and will serve as a point of comparison. If it is a processed product, the control sample should have the same code number as the suspect product. If a manufacturing problem is suspected, it is wise to sample product with the same code and also with a different code to help determine the extent of the problem.

Annual Summary
Working Group on Foodborne Illness Control: 2006

Giuseppe Conidi, MPH, Epidemiologist, Division of Epidemiology & Immunization
Emily L. Harvey, BS, Epidemiologist, Division of Epidemiology & Immunization
Lynda Glenn, MS, Epidemiologist, Division of Epidemiology & Immunization

(This document is included in for training and education purposes. Unless relevant, names of the food establishments, communities, etc. are deleted)

The attached figures graphically summarize the Working Group on Foodborne Illness Control's (WGFIC) disease investigation efforts for the calendar year 2006.

Figures 1-6 provide an overall picture of the nature and number of complaints of suspect foodborne illness received by the WGFIC in 2006. The majority of complaints are based on information obtained directly from consumers and reflects what was known or suspected at the time of the initial interview. Follow-up information, such as whether the suspected food was the source of illness, is not reflected in these data.

Figure 1 shows the number of complaints received each month for 2006. Figure 2 shows the total number of people reported ill on all initial complaints received by month. Figure 3 reflects the total number of complaints received yearly from 2000-2006. The number of complaints (N=436) received in 2006 is consistent with the mean number of annual complaints (N=414) received during the previous six year period (2000-2005). Figure 4 shows the distribution of complaints received by the setting of food establishment reported on the initial complaint. The greatest proportion (75.7%) of complaints in 2006 was associated with food service establishments (e.g., restaurants). Figure 5 reflects the number of complaints received by category of disease. Diagnoses are only recorded on the initial complaint form when at least one ill person has visited a healthcare provider and received a specific diagnosis. Many complaints (22.3%) were not associated with a specific medical diagnosis, due in large part to the fact that many individuals never seek medical attention. Additionally, some individuals who do see a healthcare provider are never given a specific diagnosis. Diagnostic information is based on information provided during the initial report and may not reflect subsequent diagnoses. Figure 6 shows the number of complaints in 2006 by agency first notified.

Figures 7-10 reflect the number of reported cases of select foodborne pathogens (i.e., *Campylobacter sp.*, *Salmonella sp.*, and *Escherichia co*li O157: H7). These data represent laboratory-confirmed cases of foodborne illness as reported to MDPH by laboratories and by local boards of health. These data are used to detect clusters of foodborne disease, but the effectiveness of this passive surveillance system is somewhat hampered by the often two to three week lag time from illness onset, medical diagnosis, and subsequent reporting to public health officials. In addition, many case reports do not include a complete food history, which makes it difficult to determine the source of the infection. The number of reported cases of campylobacteriosis and salmonellosis has remained relatively constant since 2001 (figure 7). Campylobacteriosis and salmonellosis are the most commonly reported bacterial foodborne illnesses in Massachusetts (figure 8) as well as nationally. The number of reported cases of *E. coli* O157:H7 infection has increased slightly in the past two years. In 2006 the number of reported cases of all three pathogens increased during the summer months (figures 9 and 10), consistent with a similar seasonal pattern noted in reports from previous years.

Please find selected outbreaks of 2006 on the following pages.

2006 Outbreak Summaries:

2006-02-006: Norovirus, College
An outbreak of gastrointestinal illness occurred among approximately 120 students at a local college in Greater Boston in January and February of 2006. The 120 students who reported being ill and returned the survey distributed by college health services were between the ages of 18 and 29, and experienced onset of symptoms between 1/23/2006 and 2/1/2006. Median duration of illness was 26 hours. This outbreak was characterized primarily by vomiting, diarrhea, nausea, and stomach pain. The State Laboratory Institute received stool samples from fourteen food handlers and four students. One food handler and one student tested positive for norovirus.

2006-06-002: Norovirus, Banquet Hall
An outbreak of gastrointestinal illness occurred among 67 attendees at a first communion party held on Saturday, May 13, 2006 at a Banquet Hall in a Boston suburb. Of the 56 party attendees who were interviewed, 27 met the case definition. Median incubation and illness duration periods were 37 hours and 51 hours, respectively. Stool samples from two of the five party attendees tested were positive for norovirus. None of the five food handlers tested positive for norovirus. Two party attendees also tested positive for *Yersinia frederiksenii,* but this organism was not found in any other stool specimens collected from attendees at this party. The incubation period, duration of illness, and symptoms described by the ill party attendees were consistent with norovirus infection.

2006-09-007: Non-O157 shigatoxin-producing *Escherichia coli* (STEC), Farm
On August 9, 2006 the pulsed-field gel electrophoresis (PFGE) laboratory at the State Laboratory Institute (SLI) informed the Epidemiology Program of a cluster of five cases of non-O157 shigatoxin-producing *Escherichia coli* (STEC), subsequently serotyped as *E. coli* O26:H11, that matched using two different enzymes. Case investigation revealed a Massachusetts farm in northeastern Massachusetts as a possible source for a common exposure in four out of five of the cases. Of the five matching cases of STEC, two cases picked and ate blueberries and two cases ate strawberries (one hand-picked by the case, the other ate strawberries picked by a neighbor). Three of four cases with farm exposure also reported petting goats at the farm petting zoo. Farm visits occurred from July 1 to August 4, 2006. A site visit to the farm was conducted by MDPH epidemiologists and a representative from the Massachusetts Department of Agricultural resources on August 31, 2006; hygiene practices appeared adequate and there were no obvious sources of contamination. Strawberries, blueberries, sheep stool, goat stool and water from the irrigation pond were collected during the farm site visit and sent to the food and enterics laboratories for testing. The strawberries, blueberries, sheep stool and irrigation water were negative for enteric pathogens. The goat stool tested positive for STEC, but was not a PFGE match to the human isolates. Increasing public awareness of the risks associated with close proximity to animals and hand-to-mouth contact can reduce the incidence of similar outbreaks in the future.

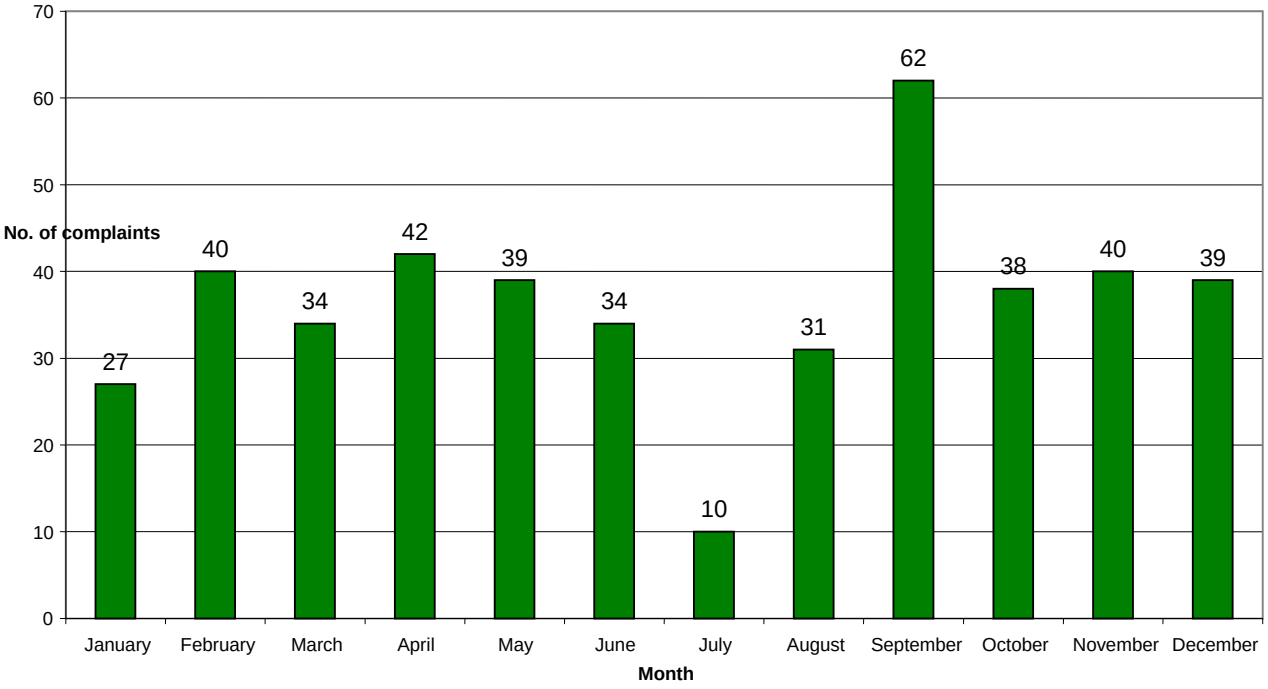
2006-10-005: Multi-state *Salmonella* Typhimurium, Restaurant
A nationwide outbreak of 186 pulsed-field gel electrophoresis (PFGE) matched cases of *Salmonella* Typhimurium occurred during September and October 2006, 50 of whom were residents of Massachusetts. The Massachusetts cases occurred between September 4, 2006 and October 5, 2006 with eight cases associated with a single food establishment in northeastern Massachusetts. Most of the Massachusetts cases reported eating lettuce or tomato during their incubation period. Preliminary results from a national case control study identified a statistical association between eating tomatoes in a restaurant and illness. Preliminary traceback results linked tomatoes from three states to a specific

supplier and distributor in Ohio. Due to the discreet nature of the outbreak, no formal recall on tomatoes was issued.

2006-10-015: Norovirus, Recreational Camp

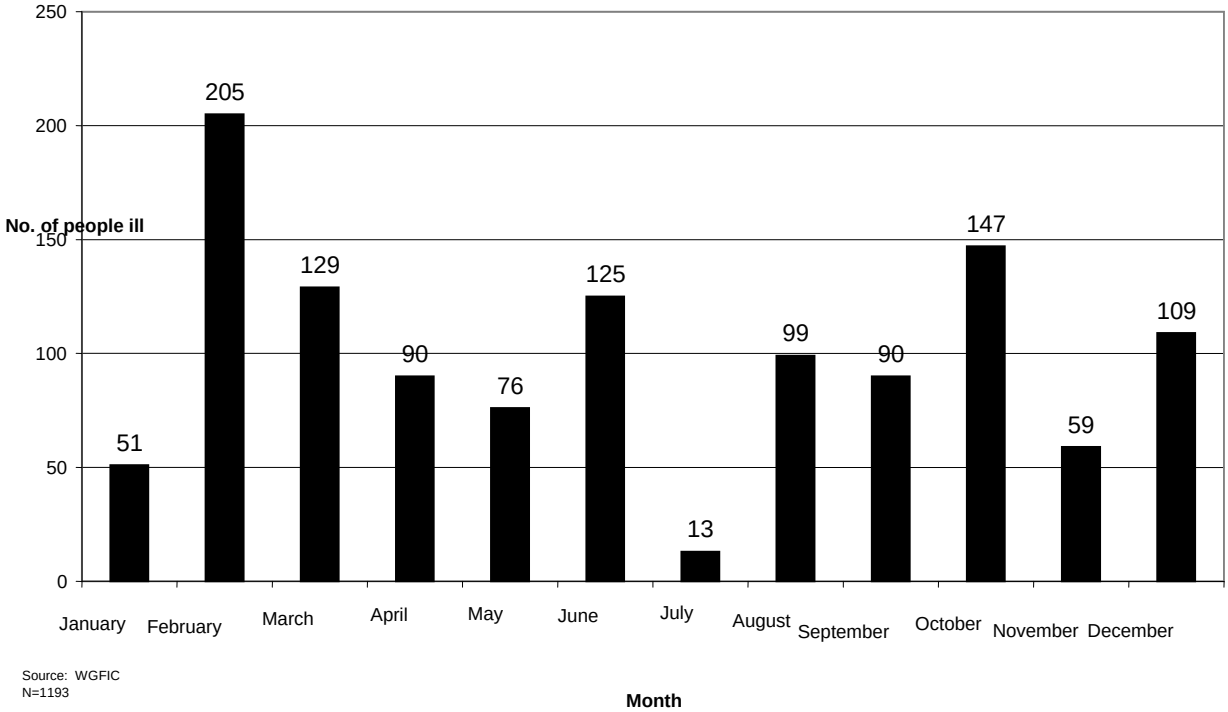
An outbreak of norovirus infection occurred among attendees of a central Massachusetts recreational children's camp on October 10, 2006. Seventy-nine people attended the camp, including 69 children, nine teachers and one parent. Out of the 71 individuals who completed a survey, 49 met the case definition. The duration of illness ranged from one hour to 96 hours with a mean of 33.5 hours and a median of 25 hours. Major symptoms included vomiting (67%), diarrhea (43%) and nausea (86%), loss of appetite (65%) and fatigue (65%). One specimen from a group of eight staff members who submitted stool specimens tested positive for norovirus. Of the nine teachers who attended the camp, three were ill and two tested positive for norovirus. While the epidemic curve indicates a point source exposure, statistical analysis of a retrospective cohort study conducted to determine risk factors for illness did not implicate any food items or camp activities epidemiologically.

Figure 1. Number of Complaints Received by WGFIC Each Month, 2006



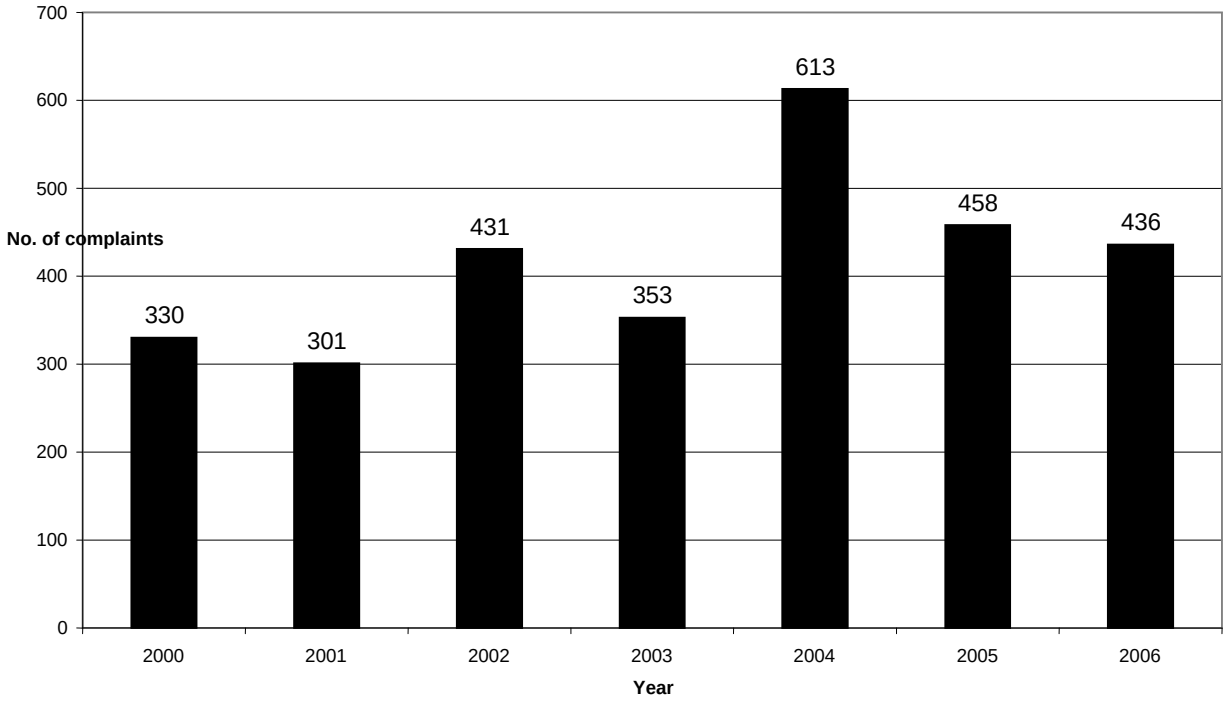
Source: WGFIC
N=436

Figure 2. Number of People Reported Ill on Initial Complaints Received by WGFIC Each Month, 2006



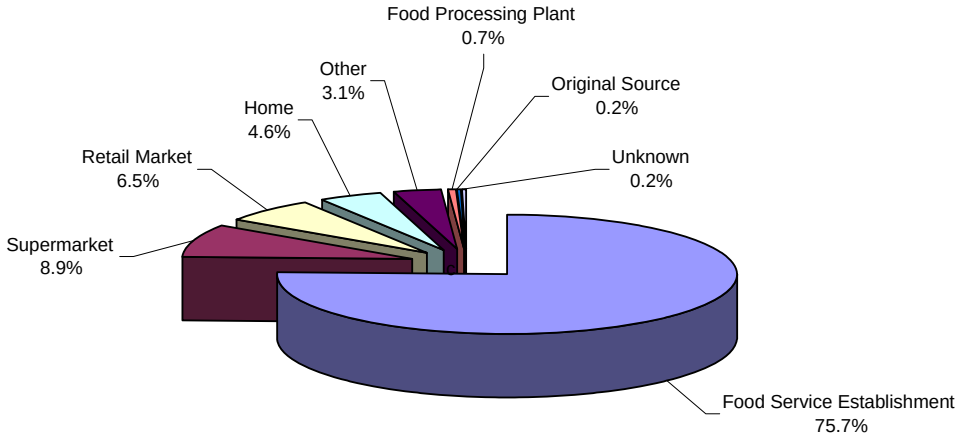
Source: WGFIC
N=1193

Figure 3. Number of Complaints Received by WGFIC by Year, 2000-2006



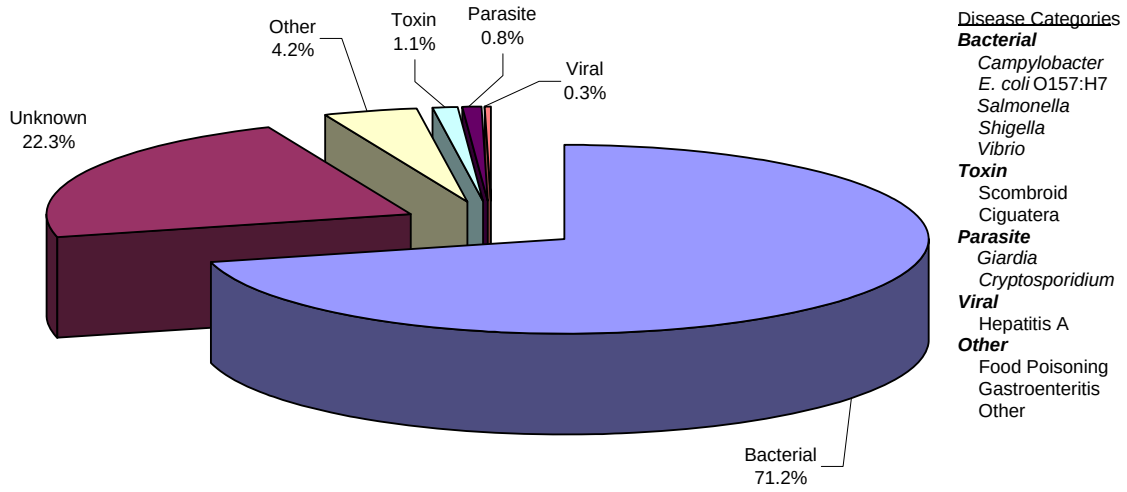
Source: WGFIC

Figure 4. Complaints Received in 2006 by Setting of Food Establishment Reported on Initial Complaint.



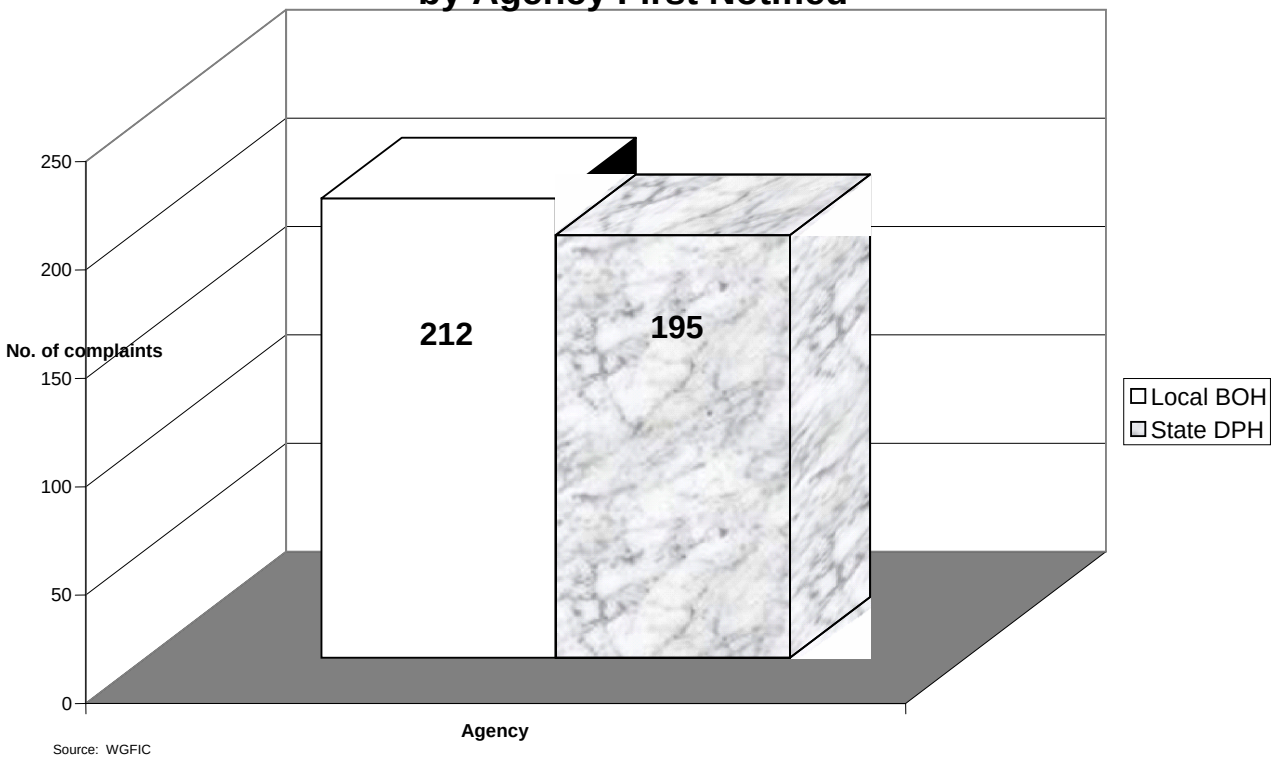
Source: WGFIC
N=415

Figure 5. Complaints Received in 2006 by Diagnosis at Time of Initial Complaint



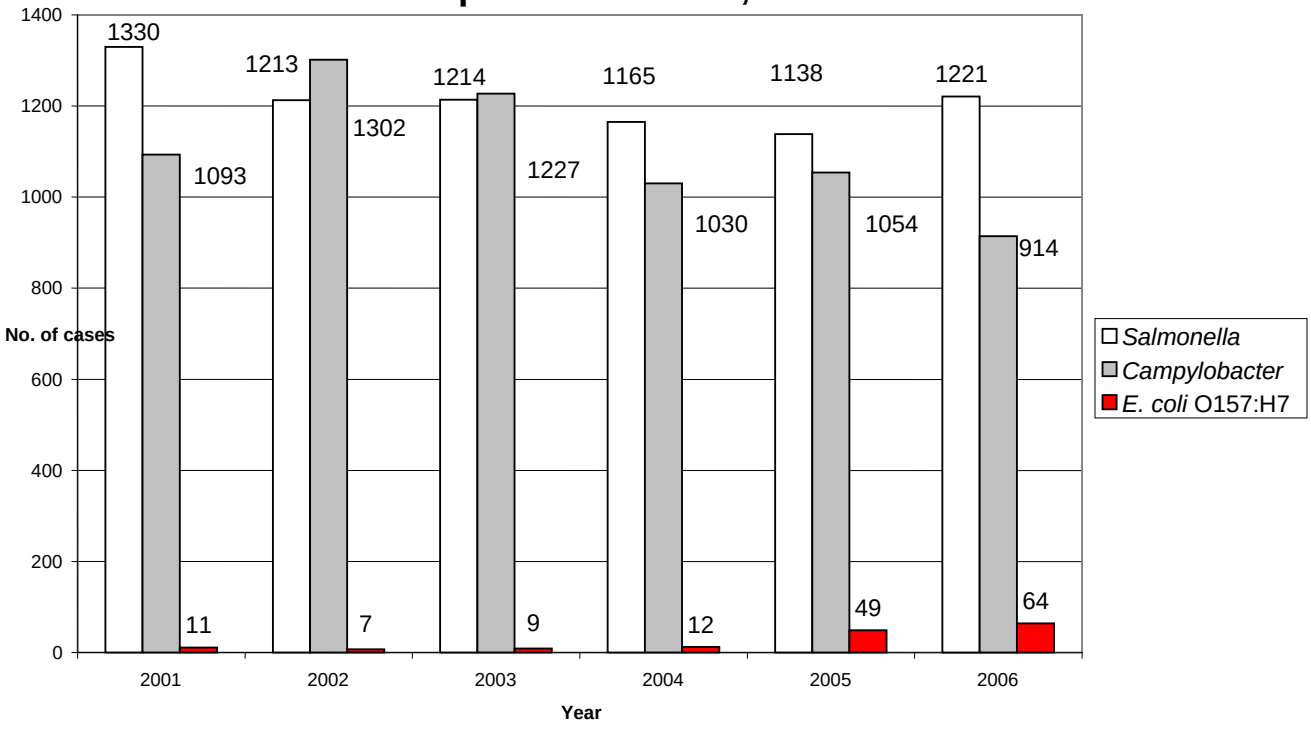
Source: WGFIC
N=354

Figure 6. Number of Complaints Received in 2006 by Agency First Notified



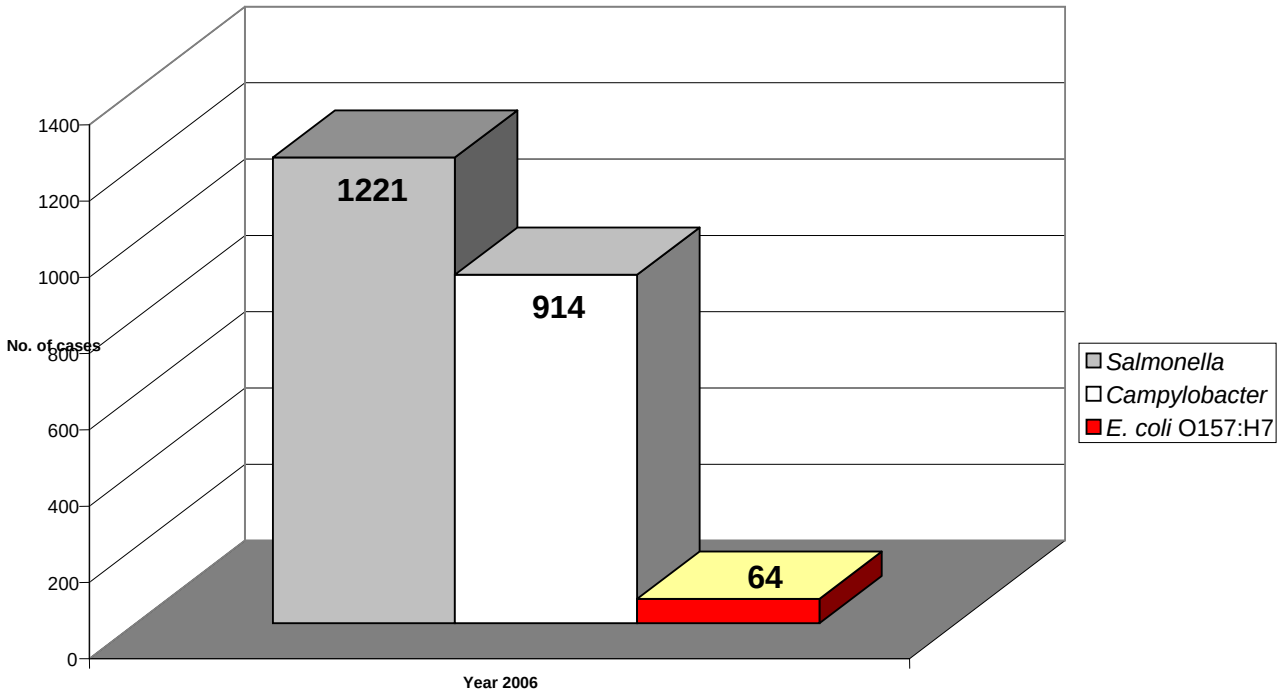
Source: WGFIC
N=407

Figure 7. *Salmonella, Campylobacter* and *E. coli* O157:H7 Cases Reported to MDPH, 2001-2006



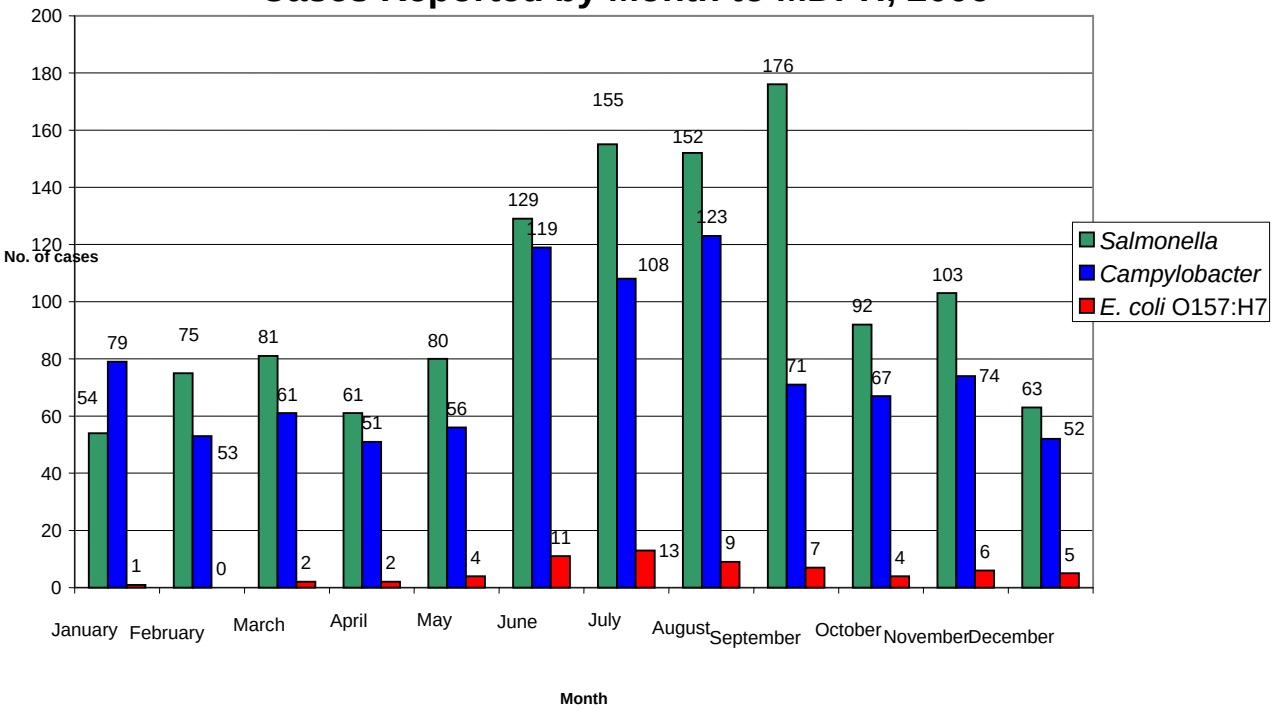
Source: MDPH, ISIS

Figure 8. *Salmonella*, *Campylobacter* and *E. coli* O157:H7 Cases Reported to MDPH, 2006



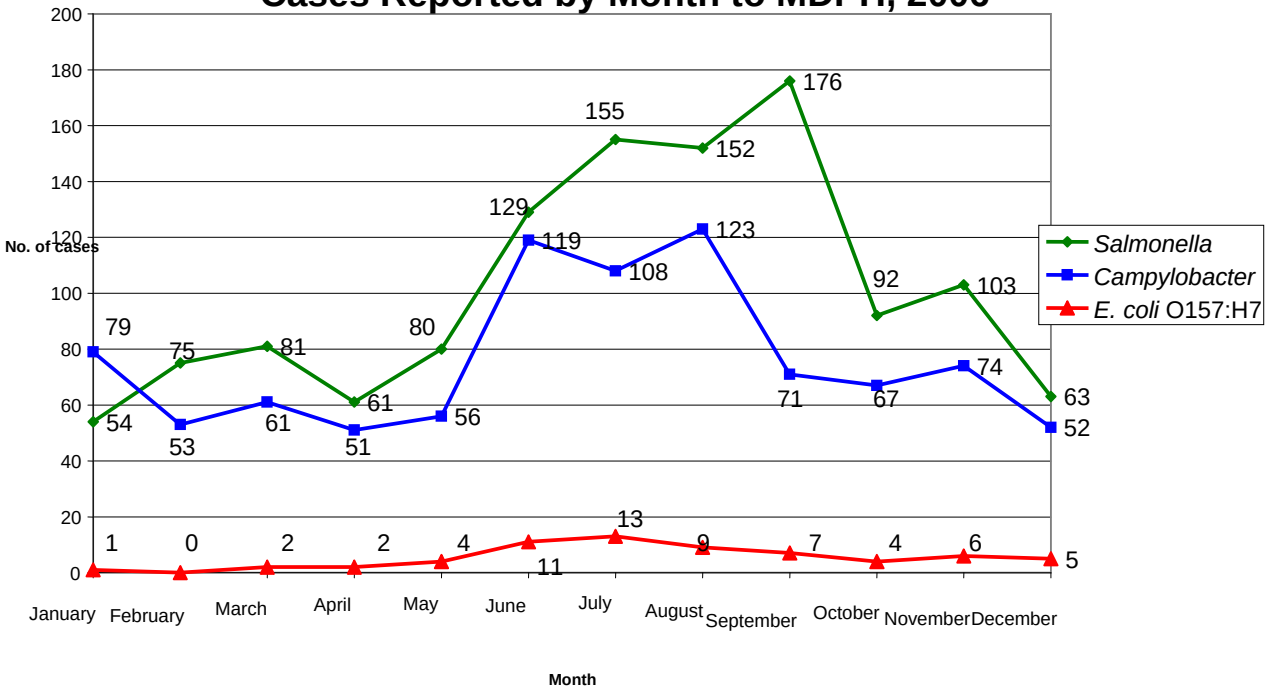
Source: MDPH, ISIS

Figure 9 *Salmonella*, *Campylobacter* and *E. coli* O157:H7 Cases Reported by Month to MDPH, 2006



Source: MDPH, ISIS

Figure 10. *Salmonella*, *Campylobacter* and *E. coli* O157:H7 Cases Reported by Month to MDPH, 2006



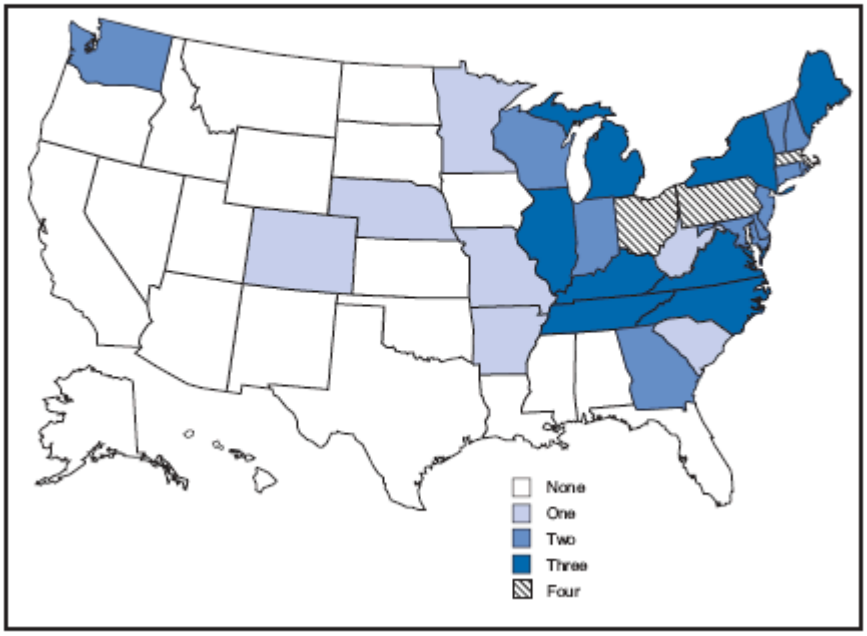
Source: MDPH, ISIS

Multistate Outbreaks of *Salmonella* Infections Associated with Raw Tomatoes Eaten in Restaurants --- United States, 2005-2006

September 7, 2007 / 56(35);909-911
Morbidity and Mortality Weekly Report
Centers for Disease Control and Prevention
Atlanta, Georgia: U.S. Department of Health and Human Services
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5635a3.htm
Accessed: October 1, 2007

During 2005-2006, four large multistate outbreaks of *Salmonella* infections associated with eating raw tomatoes at restaurants occurred in the United States. The four outbreaks resulted in 459 culture-confirmed cases of salmonellosis in 21 states (Figure). This report describes the epidemiologic, environmental, and laboratory investigations into these four outbreaks by state and local health departments, national food safety agencies, and CDC. The results of these investigations determined that the tomatoes had been supplied to restaurants either whole or precut from tomato fields in Florida, Ohio, and Virginia. These recurrent, large, multistate outbreaks emphasize the need to prevent *Salmonella* contamination of tomatoes early in the production and packing process. Current knowledge of mechanisms for tomato contamination and methods of eradication of *Salmonella* in tomatoes is incomplete; the agricultural industry, food safety agencies, and public health agencies should make tomato-safety research a priority.

FIGURE. Number of outbreaks of *Salmonella* infection associated with raw tomatoes eaten in restaurants, by state — United States, 2005–2006



Salmonella *Newport: Multiple States, July--November 2005*
A total of 72 culture-confirmed *S.* Newport isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns (PulseNet XbaI pattern JJPX01.0061 [/ BlnI pattern JJPX01.0021]) were identified from stool specimens collected during July-November 2005 in 16 states (Delaware, Illinois, Maine, Maryland, Massachusetts, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Vermont, Virginia, and Wisconsin) (*1*). Median patient age was 29 years (range: <1-75 years); 42 (58%) patients were female. Eight (11%) patients were hospitalized, and no deaths were reported.

A case-control study of persons aged 18-70 years was conducted; 29 case-patients were matched geographically with 140 well community controls in nine states. Illness was associated with eating raw, large, red, round tomatoes at restaurants; 19 (70%) of 27 case-patients ate such tomatoes compared with 26 (20%) of 128 controls (matched odds ratio [mOR]: 9.7; 95% confidence interval [CI] = 3.3-34.9). Implicated tomatoes had been purchased whole and sliced at restaurants. No single restaurant or restaurant chain was associated with the outbreak.

Investigators determined that the implicated tomatoes were grown on two farms on the eastern shore of Virginia. The outbreak strain of *S.* Newport was isolated from irrigation pond water near tomato fields in this region in October 2005. This region also had been the source of tomatoes for a multistate outbreak of *S.* Newport infections in 2002 (*1*); strains from both outbreaks had the same PFGE pattern.

Salmonella *Braenderup: Multiple States, November--December 2005*
A total of 82 culture-confirmed *S.* Braenderup isolates with indistinguishable PFGE patterns (PulseNet XbaI pattern JBPX01.0050 [/ BlnI pattern JBPA26.0004]) were identified in eight states (Illinois, Indiana, Kentucky, Massachusetts, Michigan, Ohio, Pennsylvania, and West Virginia) during November--December 2005. Median patient age was 34 years (range: 6-78 years); 51 (67%) patients were female. Eighteen (35%) patients were hospitalized, and no deaths were reported.

A case-control study of persons aged 18-60 years was conducted; 38 case-patients were geographically matched to 108 well community controls in two states. Twenty (52%) of 38 patients had eaten at chain restaurant A compared with 13 (12%) of 108 controls (mOR: 19.9; CI = 4.6-86.6). Among chain restaurant A patrons, illness was associated with eating items containing raw, prediced Roma (i.e., plum) tomatoes (OR: 11.3; CI = 2.0-62.2).

The implicated tomatoes had been grown in one of two tomato fields in Florida and were prediced and packaged at a firm in Kentucky before being shipped to chain restaurant A. The environmental investigation revealed that multiple potential animal reservoirs of *Salmonella* (e.g., cattle, wild pigs, wild birds, amphibians, and reptiles) were present in and adjacent to the drainage ditches. Environmental samples from the farm, including drainage ditch water and animal feces from around the tomato fields, yielded *Salmonella* of different serotypes than the outbreak strain.

Salmonella *Newport: Multiple States, July--November 2006*
A total of 115 culture-confirmed *S.* Newport isolates with indistinguishable PFGE patterns (PulseNet XbaI pattern JJPX01.0061 [/ BlnI pattern JJPX01.0021]) were identified from stool specimens provided during July--November 2006 in 19 states (Colorado, Connecticut, Delaware, Georgia, Illinois, Kentucky, Maine, Massachusetts, Maryland, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Tennessee, Virginia, and Washington). The PFGE pattern was identical to the pattern observed during the 2005 *S.* Newport outbreak. Median patient age was 28 years (range: <1 month-86 years); 54 (50%) patients were female. Eight (32%) patients were hospitalized, and no deaths were reported.

A case-control study of persons aged 18-75 years was conducted; 25 case-patients were geographically matched with 41 well community controls in nine states. Illness was associated with eating raw tomatoes in restaurants; 14 (67%) of 21 matched case-patients ate raw tomatoes in restaurants compared with nine (28%) of 32 controls (mOR: 4.9; CI = 1.03-23.3). No single restaurant or restaurant chain was associated with the outbreak. The source of the implicated tomatoes was not determined. An assessment of tomato-growing practices in the suspected region was conducted by the Food and Drug Administration (FDA) during the July 2007 growing season.

Salmonella *Typhimurium: Multiple States and Canada, September-October 2006*
A total of 190 culture-confirmed *S.* Typhimurium isolates with indistinguishable PFGE patterns (PulseNet XbaI pattern JPXX01.0604 [/ BlnI pattern JPXA26.0174]) were identified during September-October 2006 in 21 states (Arkansas, Connecticut, Georgia, Indiana, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, Washington, and Wisconsin). The median age of patients was 34 years (range: 2-88 years); 112 (58%) patients were female. Twenty-four (22%) patients were hospitalized, and no deaths were reported.

A case-control study of persons aged 18-70 years was conducted; 59 case-patients were geographically matched with 59 well community controls in nine states. Illness was associated with eating raw, large, red, round tomatoes at a restaurant; 26 (52%) of 50 case-patients ate such tomatoes compared with 12 (24%) of 50 controls (mOR: 3.1; CI = 1.3-7.3).

Implicated tomatoes were traced to a single packinghouse in Ohio supplied by three tomato growers from 25 fields in three counties. Tomato production had ended by the time the packinghouse was implicated. As a result, FDA deferred the investigation until the next growing season and completed the investigation in August 2007.

Reported by: *SA Bidol, MPH, Michigan Dept of Community Health. ER Daly, MPH, New Hampshire Dept of Health and Human Svcs. RE Rickert, MPH, Pennsylvania Dept of Health.* S. *Newport Investigation Team 2005,* S. *Braenderup Investigation Team 2005,* S. *Newport Investigation Team 2006,* S. *Typhimurium Investigation Team 2006, PulseNet. TA Hill, MPH, S Al Khaldi, PhD, Food and Drug Admin. TH Taylor Jr, MS, Div of Bacterial Diseases, National Center for Immunization and Respiratory Diseases; MF Lynch, MD, JA Painter, DVM, CR Braden, MD, PA Yu, MPH, L Demma, PhD, Div of Foodborne, Bacterial, and Mycotic Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases; C Barton Behravesh, DVM, CK Olson, MD, SK Greene, PhD, AM Schmitz, DVM, DD Blaney, MD, M Gershman, MD, EIS officers, CDC.*

Editorial Note:
Salmonella infections can be transmitted through various foods and cause an estimated 1.4 million illnesses and 400 deaths annually in the United States (*2*). The first large multistate outbreak of *Salmonella* infections was linked to contaminated tomatoes in 1990, when *Salmonella* Javiana caused 176 illnesses in four Midwestern states (*3*). Since 1990, at least 12 multistate outbreaks of salmonellosis traced to various types of tomatoes (e.g., red, round; Roma; and grape) have been reported to the CDC Electronic Foodborne Outbreak Reporting System (eFORS) by state public health departments. These 12 outbreaks accounted for approximately 1,990 culture-confirmed infections. However, because an estimated 97.5% of *Salmonella* infections are not confirmed by culture, these outbreaks might have resulted in as many as 79,600 illnesses (*2*).

Approximately 5 billion pounds of fresh tomatoes are eaten annually in the United States. The data in this report demonstrate the potential for large outbreaks of *Salmonella* infections caused by contaminated tomatoes. The outbreaks described were widely dispersed, indicating that contamination occurred early in the distribution chain, such as at the farm or packinghouse, rather than in restaurants. Illness in the four multistate outbreaks was associated with eating tomatoes that originated from growing regions in Florida, Ohio, and Virginia. Clusters of infections with *S.* Newport PFGE pattern JJPX01.0061 have been detected every year since 2002 and were traced to

tomatoes grown in Virginia in 2002 and 2005. These recurrent multistate outbreaks indicate that the tomato-growing environment is an ongoing source of contamination of tomatoes.

Possible sources for environmental *Salmonella* contamination of tomatoes include feces from domestic or wild animals (e.g., reptiles, amphibians, or birds) or contaminated habitats, such as ponds or drainage ditches. Although the mechanism by which tomatoes become contaminated is not known, certain possibilities are suggested by experimental evidence. Tomatoes can internalize *Salmonella* when they are immersed in water with a temperature less than the temperature of the tomato (*4*). Tomatoes also can become internally contaminated when tomato stems and flowers are inoculated with *Salmonella* (*5*), which can occur during growth if contaminated water is applied directly to plants. Contamination on the tomato surface also can be transferred to the interior of a tomato when it is cut. Once contaminated, cut tomatoes provide an efficient medium for bacterial amplification (*6*).

Tomatoes served in restaurants pose a particular concern because restaurants often store and handle tomatoes in ways that allow for amplification of bacteria. In response to these recurrent outbreaks and experimental evidence that *Salmonella* can replicate on the surface of a cut tomato, the 2007 FDA Federal Food Code has been amended so that cut tomatoes (because they have a pH $\geq$4.2 and water activity >0.99*) are defined as a "time/temperature control for safety" food, which requires refrigeration of cut, sliced, or processed tomatoes (*7*). In addition, growers, harvesters, repackers, retailers, and food service employees should follow guidelines for good manufacturing practices and good agricultural practices when handling tomatoes (*8,9*).

Consumers should avoid purchasing bruised or damaged tomatoes. All tomatoes, including those grown conventionally or organically at home or purchased from a grocery store or farmer's market, should be thoroughly washed under running water just before eating. Tomatoes that appear spoiled should be discarded. Cut, peeled, or cooked tomatoes should be refrigerated within 2 hours or discarded. Refrigeration of cut tomatoes at 40°F (4.4°C) is needed to maintain both quality and safety. Cut tomatoes should be separated from raw, unwashed produce items, raw meats, and raw seafood.

To prevent future tomato-associated outbreaks of *Salmonella* infections, further environmental and laboratory research is necessary to determine the source and routes of contamination, mechanisms by which pathogens contact tomatoes and become internalized, the stages of development at which plants are most susceptible to contamination that persists, and procedures by which contamination can be reduced or eliminated. Toward this end, the North American Tomato Trade Work Group published *Commodity Specific Food Safety Guidelines for the Fresh Tomato Supply Chain* in May 2006 to promote adoption of good agricultural practices throughout the fresh tomato supply chain. Traceback investigations in future outbreaks should consider all levels of tomato production, including the field and packinghouse. Studies focused on these areas should be a priority for the agricultural industry, food safety agencies, and the public health community.

Acknowledgments

This report is based, in part, on data contributed by state and local public health departments in Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, Washington, West Virginia, and Wisconsin; Food and Drug Administration; and RM Hoekstra, PhD, A Wilkinson, DVM, Div of Foodborne, Bacterial, and Mycotic Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases, CDC.

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* A measure of the free moisture in a food. Pure water has a water activity of 1.0 and potentially hazardous foods have a water activity of 0.85 and higher.

Date last reviewed: 9/5/2007

Seniors and Food Safety: Preventing Foodborne Illness

US Food and Drug Administration, Center for Food Safety and Applied Nutrition
http://www.cfsan.fda.gov/~dms/seniorsc.html Accessed: Sept 26, 2006

What's a Senior to Eat?

Nutritionists agree that a healthy diet includes a variety of foods. Food choices also can help reduce the risk for chronic diseases, such as heart disease, cancers, diabetes, stroke, and osteoporosis, that are the leading cause of death and disability among Americans. But for seniors, certain foods may pose a significant health hazard because of the level of bacteria present in the product's raw or uncooked state.

Seniors should avoid these products:

- Raw fin fish and shellfish, including oysters, clams, mussels, and scallops.
- Raw or unpasteurized milk or cheese.
- Soft cheeses such as feta, Brie, Camembert, blue-veined, and Mexican-style cheese. (Hard cheeses, processed cheeses, cream cheese, cottage cheese, or yogurt need not be avoided.)
- Raw or lightly cooked egg or egg products including salad dressings, cookie or cake batter, sauces, and beverages such as eggnog.
- Raw meat or poultry.
- Raw alfalfa sprouts which have only recently emerged as a recognized source of foodborne illness.
- Unpasteurized or untreated fruit or vegetable juice. When fruits and vegetables are made into fresh-squeezed juice, harmful bacteria that may be present can become part of the finished product. Most juice in the United States, 98 percent, is pasteurized or otherwise treated to kill harmful bacteria. To help consumers identify unpasteurized or untreated juices, the Food and Drug Administration is requiring a warning label on these products. The label says:

WARNING:
This product has not been pasteurized and therefore may contain harmful bacteria that can cause serious illness in children, the elderly, and persons with weakened immune systems.

New information on food safety is constantly emerging. Recommendations and precautions are updated as scientists learn more about preventing foodborne illness. You need to be aware of and follow the most current information on food safety. Visit http://vm.cfsan.fda.gov/~mow/foodborn.html for more recent information on foodborne illness.

Salmonella Heidelberg Outbreak

Shauna Onofrey, MPH, Epidemiologist, Division of Epidemiology & Immunization
Charles Daniel, MPH, Epidemiologist, Division of Epidemiology & Immunization
Kim K. Foley, RS, Food Protection Program

(This document is included for training and education purposes. Unless relevant, names of the food establishments, communities, etc. are deleted.)

I. Summary

An outbreak of *Salmonella* Heidelberg infection occurred among patrons who ate at a restaurant in Essex County, Massachusetts in November and December, 2005. The distribution of onset dates indicated that the source was more likely to be a food handler than a food item. Three of 43 employees tested positive for *Salmonella* sp. two employees were positive for *Salmonella* Heidelberg and one was positive for *Salmonella* Indiana. All three employees reported being asymptomatic

II. Introduction

On Friday, December 2, 2005 the Epidemiology Program (EPI) was contacted by the neighboring community Board of Health regarding a foodborne illness complaint. The complainant had attended a wedding party at the restaurant, a buffet Chinese restaurant, on November 18, 2005, and subsequently was diagnosed with *Salmonella* Heidelberg. When it was learned from the County Board of Health (BOH) that a resident from another state who ate at the same restaurant on November 19, 2005 had also been diagnosed with *Salmonella* sp infection, an investigation was initiated by the Working Group on Foodborne Illness Control (WGFIC) and the local Board of Health (BOH). A third case of *Salmonella* from a neighboring state who had eaten at the restaurant on November 13, 2005 was identified on Thursday, December 8.

III. Background

The restaurant is a large buffet style restaurant in Essex County that serves lunch and dinner seven days a week. More than eight buffet stations include numerous hot items such as soups, lo mein and fried rice, as well as cold items such as salad, fruit, jello, sushi and self serve ice-cream.

IV. Methods

A. Epidemiologic

The BOH collected a list of menu items served at the restaurant on November 18 and 19 to aid in the development of a questionnaire to examine what food items might be implicated as the source of the outbreak. Case reports from a neighboring Massachusetts community BOH and a neighboring state BOH were collected on the known cases. The organizer of the wedding party that the index case had attended was also contacted. Massachusetts case report forms and laboratory test results were reviewed to identify additional cases.

B. Environmental

On 12/2/05, the local Board of Health inspected the restaurant. Food handlers were interviewed with the assistance of an interpreter.

C. Laboratory

Stool specimens were collected on 43 foodhandlers and were tested at the State Laboratory Institute (SLI) for S*almonella*.

V. Results

A. Epidemiologic

Although a list of menu items served at the restaurant on November 18 and 19 was collected, a questionnaire was not developed or administered. The identification of three unrelated cases who ate at the restaurant on three different dates over a period of seven days led to the hypothesis that the outbreak was caused by a food worker rather than a specific food product. It was very unlikely that the same food would have been served on all of the dates identified.

The wedding party organizer was contacted. He reported that 75 people had attended the party, two were hospitalized, and four or more had been ill enough to miss work. EPI requested a list of contacts for the party attendees to confirm these numbers, but this was never provided. Two of the party guests contacted the restaurant to say they were sick, but did not contact the BOH.

No additional cases were identified through case report and laboratory test review.

B. Environmental

The BOH indicated there was a history of non-compliance and complaints with this facility. The inspection of the facility on 12/05/2005 showed a number of critical violations, including bare hand contact with food, inadequate handwashing procedures, and possible cross-contamination issues. The establishment did not have a HAACP (Hazard Analysis Critical Control Point) plan established. A large volume of the food was prepared in advance. The PIC (person in charge) was unable to demonstrate knowledge of HACCP principles of food preparation. No employees reported illness, but there was a language barrier that made communication difficult. The BOH required the restaurant to hire a consultant to monitor food-handling techniques to assess correct food handling practices. A detailed action plan was created to correct violations. The BOH worked closely with the MDPH Food Protection Program (FPP) throughout the process to determine the best course of action. Following laboratory results, food employees were re-interviewed with an interpreter, but still no one reported illness. On December 22, 2005, the local BOH sent a letter to the owners of the restaurant notifying them that, if: 1) food workers who tested positive for salmonella returned to work before submitting two negative stool samples, 2) another critical food violation was identified, or 3) an additional positive case of *Salmonella* linked to the restaurant was identified after December 3, 2005, their license to operate a food establishment would be suspended.

C. Laboratory

Three restaurant food workers tested positive for S*almonella sp*. Two were positive for serotype Heidelberg, and one was positive for serotype Indiana. The *S.* Heidelberg isolate from one of the food handlers was a PFGE match to isolates from three of the patrons.

VI. Discussion

Salmonella is the second most common cause of laboratory confirmed enteric disease, as reported by the Foodborne Diseases Active Surveillance Network between 1996 through 2000. The main vehicles of transmission are foods of animal origin, foods that have been contaminated by contact with an

animal product or infected human or contaminated water. Transmission can also occur through contact with infected reptiles and other reservoirs.

The three groups of patrons who reported illness ate at the Restaurant on three separate dates spread over a seven day period. The distribution of these dates indicated that it was unlikely that one particular food item was contaminated with the bacteria. Although no food handling employees reported symptoms of illness, three tested positive for *Salmonella* sp. While these employees may have aided in the spread of this illness, we cannot be sure of the original source. The employees also ate food prepared by chefs at the restaurant. The inspection of the facility indicated practices that could lead to cross contamination of food. It is possible that cross contamination first introduced *Salmonella* that infected some employees at the facility, or that the infection had spread through all the employees, but only these employees were still shedding bacteria. It is likely that inadequate foodhandling practices and improper handwashing frequency contributed to the spread of *Salmonella* to the patrons.

This outbreak highlights the importance of good communication with neighboring states. The prompt identification of multiple cases, including residents from another state, prompted swift and thorough action to be taken by the local BOH, including the collection of stool specimens from all employees.

VII. Recommendations

The following recommendations were made for preventing foodborne illness transmission:

- Food workers should be made aware of their duty to report symptoms of foodborne illness.
- Food workers should wash hands thoroughly with soap and warm water before eating or preparing food, and after using the toilet
- Food workers should use physical barriers such as gloves during preparation of ready-to-eat foods.
- Employees should be trained in the appropriate use of gloves.
- Food workers should make sure all food preparation areas are clean and sanitized before use.
- Food workers should cook food appropriately and thoroughly.

References

American Academy of Pediatrics. *Salmonella* Infections. In: Pickering LK, ed. *2003 Red Book: Report of the Committee on Infectious Diseases.* 25th ed. Elk Grove Village, IL. American Academy of Pediatrics; 2003:541-547

The First Rule of Safe Food Preparation in the Home is Keep It Clean

Source: Excerpted from FDA Consumer - The Unwelcome Dinner Guest: Preventing Foodborne Illness, (http://www.fda.gov/fdac/reprints/dinguest.html) Jan.-Feb. 1991; Revised Dec. 1997, Feb. 1999, Oct. 1999, and June 2000

Accessed: October 1, 2007 http://www.cfsan.fda.gov/~dms/qa-prp6.html

The first cardinal rule of safe food preparation in the home is: **Keep everything clean!**

The cleanliness rule applies to the areas where food is prepared and, most importantly, to the cook. Wash hands with warm water and soap for at least 20 seconds before starting to prepare a meal and after handling raw meat or poultry. Cover long hair with a net or scarf, and be sure that any open sores or cuts on the hands are completely covered. If the sore or cut is infected, stay out of the kitchen.

Keep the work area clean and uncluttered. Wash countertops with a solution of 5 milliliters (1 teaspoon) of chlorine bleach to about 1 liter (1 quart) of water or with a commercial kitchen cleaning agent diluted according to product directions. They're the most effective at getting rid of bacteria.

Also, be sure to keep dishcloths and sponges clean because, when wet, these materials harbor bacteria and may promote their growth. Wash dishcloths and sponges weekly in hot water in the washing machine.

While you're at it, sanitize the kitchen sink drain periodically by pouring down the sink a solution of 5 milliliters of bleach to 1 liter of water or a commercial kitchen cleaning agent. Food particles get trapped in the drain and disposal and, along with moistness, create an ideal environment for bacterial growth.

Use smooth cutting boards made of hard maple or plastic and free of cracks and crevices. Avoid boards made of soft, porous materials. Wash cutting boards with hot water, soap, and a scrub brush. Then, sanitize them in an automatic dishwasher or by rinsing with a solution of 5 milliliters of chlorine bleach to about 1 liter of water.

Always wash and sanitize cutting boards after using them for raw foods, such as seafood or chicken, and before using them for ready-to-eat foods. Consider using one cutting board only for foods that will be cooked, such as raw fish, and another only for ready-to-eat foods, such as bread, fresh fruit, and cooked fish.

Always use clean utensils and wash them between cutting different foods.

Wash the lids of canned foods before opening to keep dirt from getting into the food. Also, clean the blade of the can opener after each use. Food processors and meat grinders should be taken apart and cleaned as soon as possible after they are used.

Do not put cooked meat on an unwashed plate or platter that has held raw meat.

Wash fresh fruits and vegetables thoroughly, rinsing in warm water. Don't use soap or other detergents. If necessary--and appropriate--use a small scrub brush to remove surface dirt.

Botulism Associated with Commercially Canned Chili Sauce - Texas and Indiana, July 2007

July 30, 2007 / 56(Dispatch);1-3
Morbidity and Mortality Weekly Report
Centers for Disease Control and Prevention
Atlanta, Georgia: U.S. Department of Health and Human Services
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5630a4.htm
Accessed: October 1, 2007

On July 7 and July 11, 2007, public health officials in Texas and Indiana, respectively, reported to CDC four suspected cases of foodborne botulism, two in each state. Investigations conducted by state and local health departments revealed that all four patients had eaten brands of Castleberry's hot dog chili sauce before illness began. Botulinum toxin type A was detected in the serum of one Indiana patient and in a leftover chili mixture obtained from his home. CDC informed the Food and Drug Administration (FDA) of the apparent link between illness and consumption of the chili sauce. On July 18, FDA issued a consumer advisory, and the manufacturer, Castleberry's Food Company (Augusta, Georgia), subsequently recalled the implicated brand and several other products produced in the same set of retorts (commercial-scale pressure cookers for processing canned foods) at the same canning facility. Examination of the canning facility in Georgia during the outbreak investigation had identified deficiencies in the canning process. On July 19, the U.S. Department of Agriculture Food Safety and Inspection Service (FSIS) issued a press release that announced a recall of chili and certain meat products from the Castleberry canning facility and provided recommendations to consumers. That recall was expanded on July 21 to include additional canned products. A fifth case of botulism potentially linked to one of the recalled products is under investigation in California. This report describes the ongoing investigation by members of OutbreakNet* and others and the measures undertaken to control the outbreak, which is the first outbreak of foodborne botulism in the United States associated with a commercial canning facility in approximately 30 years. Clinicians should be vigilant for symptoms of botulism, including symmetric cranial nerve palsies, especially if accompanied by descending flaccid paralysis. Consumers should not eat any of the recalled chili sauce or other recalled products and should carefully dispose of all recalled products. Information regarding product disposal is available at http://www.cdc.gov/botulism/botulism_faq.htm.

Case Reports

Texas. On July 7, the Texas Department of State Health Services (TDSHS) reported to CDC two suspected cases of foodborne botulism in children who are siblings. On June 29, both patients had onset of illness that progressed to include cranial nerve palsies and symmetric, descending paralysis typical of botulism. The two children initially were evaluated at two different hospitals, where multiple diagnoses were considered. After one child was transferred to the same hospital as the sibling, botulism was identified as the etiology of the shared symptoms. The two children required mechanical ventilation; botulinum antitoxin was requested on the evening of July 7, released by CDC, and administered the next morning. Patient stool and serum specimens, collected 9 days after symptom onset, were negative for botulinum toxin by mouse bioassay. Initial stool cultures did not yield *Clostridium botulinum*.

The children had shared several meals in the days before symptoms began. They had eaten Castleberry's Austex Hot Dog Chili Sauce Original for lunch on June 28. The opened can from this meal had been discarded and could not be located. However, one unopened can of this product, produced on May 7 at the Castleberry's Food Company canning facility in Georgia and purchased at the same time as the discarded can, was found in the children's home. The TDSHS laboratory tested an aliquot from this can using an enzyme-linked immunosorbent assay (ELISA) for botulinum toxin

and did not detect toxin. One child remains hospitalized and is on mechanical ventilation. The second child has been removed from mechanical ventilation and begun rehabilitation.

Indiana. On July 11, the Indiana State Department of Health (ISDH) reported to CDC two suspected cases of foodborne botulism in a married couple. The couple had onset of symptoms on July 7. Like the Texas children, the Indiana patients initially were evaluated at two different hospitals, where multiple diagnoses were considered. On July 9, after both were admitted to the same hospital, botulism was identified as the etiology of the shared symptoms. The man and woman were hospitalized with cranial nerve palsies and symmetric, descending paralysis typical of botulism and were placed on mechanical ventilation. On July 11, CDC released botulinum antitoxin, and the antitoxin was administered to both patients. Serum samples collected on July 10 were sent to CDC's Botulism Reference Laboratory and received on July 15. On July 16, CDC detected botulinum toxin type A by mouse bioassay in the man's serum sample. Botulinum toxin also was detected by mouse bioassay in the woman's serum sample, but the sample volume was insufficient to determine the toxin type.

During the initial investigation by ISDH, food histories could not be obtained from the patients because of the severity of their illnesses. Local health officials collected several foods from the home of the patients, including an unlabeled, sealed plastic bag of leftover chili mixture from the refrigerator. On July 16, CDC detected botulinum toxin type A by mouse bioassay in the chili mixture. Empty, well-rinsed cans (with no visible signs of food debris) of Castleberry's Hot Dog Chili Sauce Original and chili made by another company were found in the couple's recycling bin. CDC re-rinsed the two cans and tested the rinse water for botulinum toxin by mouse bioassay; both were negative. The label on the Castleberry's Hot Dog Chili Sauce Original can indicated a production date of May 8 and a time of 2:23 a.m., less than 5 hours after the 9:41 p.m., May 7 production time indicated on the can collected from the Texas patients; the Indiana can had been manufactured in the same set of retorts as the Texas can. Both patients remain hospitalized and on mechanical ventilation.

On July 17, CDC OutbreakNet staff members provided information regarding the production dates and times to FDA; the evidence strongly suggested that brands of Castleberry's hot dog chili sauce were the common source of the four cases of botulism. On July 18, FDA issued a consumer advisory. On that same day, after being informed about the outbreak and findings from FDA investigation of the canning facility, Castleberry's Food Company issued a voluntary recall that included limited production dates of Castleberry's Hot Dog Chili Sauce Original, Castleberry's Austex Hot Dog Chili Sauce Original, and Kroger Hot Dog Chili Sauce. That recall was expanded on July 21 to include all production dates for 91 types of canned chili sauce, chili, other meat products, chicken products, and dog food that were manufactured in the same set of retorts as the hot dog chili sauce at the Castleberry's Food Company facility in Georgia. These included Castleberry's brands and products produced by the manufacturer but distributed under 25 other brand names (e.g., Austex, Kroger, and Piggly Wiggly).[†]

California. On July 25, the California Department of Public Health (CDPH) reported to CDC a case of botulism caused by botulinum toxin type A with a potential link to one of the recalled products. On July 1, several days after reportedly eating a recalled chili product, the patient, a woman, had onset of symptoms that progressed to include cranial nerve palsies and bilateral generalized weakness. She was hospitalized on July 5. On July 7, CDPH released botulinum antitoxin, which was administered to the patient. Botulinum toxin type A was detected by mouse bioassay from a serum sample collected on July 7. The product had been discarded and could not be tested. The patient was hospitalized for 10 days and is now recovering at home. CDPH is continuing to investigate to determine whether the patient's illness was associated with the recalled chili product.

Canning Facility Investigation
The Castleberry's canning facility in Georgia produces both FDA- and FSIS-regulated products. The outbreak investigation by FDA and FSIS identified production deficiencies that might have permitted spores of *C. botulinum* to survive the canning process. *C. botulinum* spores are in the environment and can be present in foods that have not been properly subjected to high temperature and pressure during the canning process. Anaerobic conditions, low acidity (pH>4.6), low salt and sugar concentrations, and temperatures >39.0°F (>3.9°C) allow germination of *C. botulinum* spores and subsequent production of botulinum toxin. FDA officials tested 17 swollen cans of Castleberry's hot dog chili sauce produced on May 8 in the same set of retorts as the cans associated with the Indiana and Texas botulism cases. Sixteen of the 17 cans were positive for botulinum toxin type A by ELISA. Mouse bioassay results were consistent with ELISA findings. Castleberry's Food Company has closed its Georgia canning facility and has hired a firm to help recall products from approximately 8,500 retail outlets.

Reported by: *MM Ginsberg, MD, County of San Diego, Health and Human Svcs Agency. L Granzow, MPH, RF Teclaw, DVM, PhD, Indiana State Dept of Health. LK Gaul, PhD, S Bagdure, MD, A Cole, R Drumgoole, Texas Dept of State Health Svcs. Food and Drug Admin. US Dept of Agriculture Food Safety and Inspection Svc. EJ Barzilay, MD, MS Biggerstaff, MPH, MF Lynch, MD, SE Maslanka, PhD, IT Williams, PhD, Div of Foodborne, Bacterial, and Mycotic Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases; PC Juliao, PhD, C Barton Behravesh, DVM, CK Olson, MD, EIS officers, CDC.*

Editorial Note:
In the United States, foodborne botulism usually is associated with home-canned foods. During 1950--2005, local and state health departments reported to CDC 405 events (i.e., single cases or outbreaks) of foodborne botulism in which an implicated food item was identified. Of these 405 events, 371 (92%) were linked to home-processed foods and 34 (8%) to commercially processed foods, including foods prepared in restaurants. Only four of the outbreaks associated with commercially processed foods (i.e., canned tuna, liver paste, vichyssoise, and beef stew) were associated with deficiencies in a commercial canning process. The last such outbreak in the United States occurred in 1974 and was associated with commercially canned beef stew (*1)*. Although rare, any deficiency in the retort canning process is a major public health concern because of the severity of botulism and the widespread distribution of canned products.

Botulism is a nationally notifiable disease. Investigators are actively seeking additional cases that might be linked to the current outbreak by issuing health alerts and examining reported botulism cases dating back to 2005. Clinicians should consider botulism in patients with symmetric cranial nerve palsies, especially if accompanied by descending flaccid paralysis. Suspected cases of botulism should be reported immediately to local or state public health officials, who should then call the 24-hour CDC Emergency Operations Center (770-488-7100); callers will be connected immediately with an on-call CDC botulism specialist. Health-care providers and public health officials are encouraged to inquire specifically about consumption of the recalled canned products as part of the food history of persons with suspected botulism. Additional information regarding this botulism outbreak is available at http://www.cdc.gov/botulism/botulism.htm. Consumers should check their homes for any of the 91 recalled products listed by Castleberry's Food Company at http://www.castleberrys.com/news_productrecall.asp. Persons with unopened cans of recalled products should dispose of the cans without opening or puncturing them, as described at http://www.cdc.gov/botulism/botulism_faq.htm.

Reference

1. Blake PA, Horwitz MA, Hopkins L, et al. Type A botulism from commercially canned beef stew. South Med J 1977;70:5--7.

* A network of public health epidemiologists at the local, state, and federal levels (including employees of CDC, FDA, and FSIS) who investigate foodborne and diarrheal disease outbreaks.

† The recalled products were distributed in 49 of the 50 United States (all states except Alaska). A listing of the 91 products recalled as of July 21 is available at http://www.castleberrys.com/news_productrecall.asp.

Preventing Health Risks Associated with Drinking Unpasteurized or Untreated Juice

Centers for Disease Control and Prevention November 17, 2005
http://www.cdc.gov/foodborne/juice_spotlight.htm Accessed: October 1, 2007

Orange, apple, grape or cranberry- juice comes in many different flavors. Juice provides essential nutrients that help keep people healthy. Consumers today have numerous choices when it comes to drinking juice. One of the decisions they must make is whether to buy pasteurized or unpasteurized juice.

Although illness caused by juice is rare, several outbreaks of diarrheal illness related to juice have been reported in the United States in the last decade. Most outbreaks of illness due to juice have been linked to untreated or inadequately treated juice products. Most juice sold in the United States is treated. One of the most common treatments used is pasteurization.

Some outbreaks of foodborne illness linked to juice:

1996: Outbreak of *E. coli* O157:H7 infections linked to untreated apple juice sold in multiple states

2003: Outbreak of *Cryptosporidium* infections linked to apple cider inadequately treated with ozone

2005: Outbreak of *Salmonella* infections linked to inadequately treated orange juice marketed as 'fresh squeezed' and sold in multiple states

Pasteurized juice is heated to a high temperature for a short time before it is sold. By pasteurizing juice, pathogens (germs) which may be present in the liquid are killed. Most juice concentrate sold in grocery stores has been heat treated as part of the concentration process and this is equivalent to pasteurization.

About 98% of all juices sold in the United States are pasteurized. Pasteurized juice can be found as frozen concentrate, displayed at room temperature or in the refrigerated section of your supermarket. Pasteurized juice products may say "Pasteurized" on their labels. Besides pasteurization, some juices are treated with other processes.

Treated juice, more commonly found in health-food stores and farm markets, has been treated to kill pathogens that may be present in the juice through a method other than pasteurization, such as UV irradiation, surface treatment of the fruit or high pressure treatment. Some types of treated juice may be marketed as "fresh squeezed."

The methods used to treat the juice must have been proven to work and verified by the Food and Drug Administration (FDA). These processes must be carried out properly for the treatment to be successful. If these requirements are not met, the treatment may not be effective in killing pathogens and people who consume the juice may become ill. There have been two recent outbreaks of illness related to inadequately treated juices. One was related to inadequate treatment with ozone and the other to inadequate surface treatment of the fruit. Treated juice products have labels that do not have a warning label like the one below, and do not say "Pasteurized." Treated unpasteurized juice is safe if it has been properly processed by a proven effective treatment method such as UV irradiation.

> **WARNING:** This product has not been pasteurized and therefore, may contain harmful bacteria that can cause serious illness in children, the elderly, and persons with weakened immune systems.

Untreated (raw) juice has not been treated in any way to kill pathogens that may be present. This type of juice may be found in the refrigerated sections of grocery stores, health-food stores, cider mills, and farm markets. Another form of untreated juice is untreated cider. One way to make this cider safer is to heat it to at least 170° F. Prepackaged, untreated juice must bear a warning label that looks similar to this one:

To minimize health risk, young children, the elderly and people with weakened immune systems should not consume packaged juice that bears the above warning label or any other form of juice that is known to be untreated (e.g. untreated juice served by the glass at a roadside cider stand). Anyone who wishes to reduce their risk may follow this recommendation.

If it is unclear that a juice has been treated to destroy harmful bacteria, avoid drinking it.

Food Safety for You!
Fruits, Vegetables and Juices

U.S. Food and Drug Administration and the National Science Teachers Association - September 2001
Accessed: October 1, 2007 http://www.cfsan.fda.gov/%7Edms/fttfruit.html

FOOD SAFETY IMPLICATIONS

Fresh Fruits and Vegetables

Raw fruits and vegetables can become contaminated along the farm-to-table continuum. Produce used for salads - lettuce and spinach, for example - grow low to the ground, where they are likely to come in contact with contaminated fertilizers. Sometimes they're irrigated with contaminated waters or picked by farm workers with poor hygiene practices.

The complex, multi-layered surfaces of salad produce are more difficult to clean after picking than produce with a smooth surface, such as apples or potatoes. Because fresh fruits and vegetables are usually eaten raw, they can pose a health risk if they're not properly handled. Therefore, all produce needs to be thoroughly washed and safely prepared and handled before it is eaten.

Fruit and Vegetable Juices

Ninety-eight percent of the juice sold in the United States is pasteurized (heat-processed to kill pathogenic bacteria). The remaining 2% is unpasteurized and may contain harmful bacteria. For example, when fruits and vegetables are fresh-squeezed, harmful bacteria from the outside of the produce can become a part of the finished product. If it's ingested, children, the elderly, and people with weakened immune systems risk serious illness or even death.

HUMAN PATHOGEN ASSOCIATIONS

Cryptosporidium, parasite	juice/cider and produce
Cyclospora, parasite	produce
Escherichia coli O157:H7	juice/cider and produce
Norwalk Virus	produce
Salmonella	juice and produce
Shigella	produce

Food Safety Precautions

Fresh Fruits and Vegetables

- Thoroughly rinse raw fruits and vegetables under running water before eating them. Don't use soap, detergents, or bleach solutions.
- If necessary - and appropriate - use a small vegetable brush to remove surface dirt.
- Try to cut away damaged or bruised areas - bacteria can thrive in these places.
-

Fruit and Vegetable Juices

- Children, the elderly, and people with weakened immune systems should only drink juices that have been pasteurized or otherwise treated to kill pathogenic bacteria.
- If you or someone in your family is in one of the at-risk groups and you cannot determine if a juice has been processed to destroy harmful bacteria, either don't use the product or bring it to a boil to kill any harmful bacteria that may be present.
- **Pasteurized or Treated Juice.** *Pasteurized* juice can be found in the refrigerated sections of stores. Like milk, pasteurized juice must be refrigerated.
- *Treated* juice consists of shelf-stable juice normally found in non-refrigerated, shelf-stable containers, such as juice boxes, bottles, or cans. It is treated at a much higher temperature than pasteurized juice and is packaged in special airtight containers.

- **Unpasteurized or Untreated Juice** is normally found in the refrigerated sections of grocery, health-food stores, cider mills, or farm markets. Unpasteurized or untreated juice must have the following warning on the label:

> **WARNING:** This product has not been pasteurized and therefore, may contain harmful bacteria that can cause serious illness in children, the elderly, and persons with weakened immune systems.

Cantaloupe and Other Melons

Any bacteria on the outside of fruits can be transferred to the *inside* when the fruit is peeled or cut. To prevent this:

- Thoroughly rinse fruits that require peeling or cutting - such as cantaloupe and other melons - under running water before eating them. As an added precaution, use a small vegetable brush to remove surface dirt.

Raw Sprouts: (including alfalfa, clover, and radish)

Sprouts that are often served raw as an addition to salads, wraps, and sandwiches are a potentially hazardous food. Often, bacteria get into the seeds themselves through cracks in the shell before the sprouts are grown. These bacteria are nearly impossible to wash out once this occurs. Thoroughly washing sprouts is no guarantee that you've gotten rid of pathogenic *E. coli* and *Salmonella*. Even cooking sprouts is not a solution to potential bacterial contamination.

- **All consumers should avoid eating sprouts of any sort.**

> Did You Know?
> On the average, each person in the United States consumes more than 126 pounds of **potatoes**, 95 pounds of other **vegetables**, and 92 pounds of fresh **fruit** each year.
>
> *E. coli* O157:H7 is very resistant to acid, so it can survive in an acidic medium like **orange** or **apple juice** for a long time.

Safe Handling of Raw Produce and Fresh-Squeezed Fruit and Vegetable Juices.

U.S. Food and Drug Administration, .November 3, 2005
http://www.cfsan.fda.gov/~dms/prodsafe.html#stayinghealthy Accessed: October 1, 2007

Fruits and vegetables are an important part of a healthy diet. Your local markets carry an amazing variety of fresh fruits and vegetables that are both nutritious and delicious.

As you enjoy fresh produce and fresh-squeezed fruit and vegetable juices, it's important to handle these products safely in order to reduce the risks of foodborne illness.

Avoiding Foodborne Risk is Easy

Harmful bacteria that may be in the soil or water where produce grows may come in contact with the fruits and vegetables and contaminate them. Or, fresh produce may become contaminated after it is harvested, such as during preparation or storage.

Eating contaminated produce (or fruit and vegetable juices made from contaminated produce) can lead to foodborne illness, which can cause serious - and sometimes fatal - infections. However, it's easy to help protect yourself and your family from illness by following these safe handling tips!

Buying Tips for Fresh Produce

You can help keep produce safe by making wise buying decisions at the grocery store.

- **Purchase produce** that is **not bruised** or damaged.
- When selecting **fresh-cut produce** - such as a half a watermelon or bagged mixed salad greens - choose only those items that are **refrigerated or surrounded by ice**.
- **Bag fresh fruits and vegetables separately** from meat, poultry and seafood products when packing them to take home from the market.

Storage Tips for Fresh Produce

To maintain quality of fresh produce:

- Certain **perishable fresh fruits and vegetables** (like strawberries, lettuce, herbs, and mushrooms) can be best maintained by storing in a clean refrigerator at a temperature of **40° F or below**. If you're not sure whether an item should be refrigerated to maintain quality, **ask your grocer**.
- All produce that is purchased **pre-cut or peeled should be refrigerated** to maintain both quality and safety.
- Keep your refrigerator set at 40° F or below. Use a fridge thermometer to check!

Preparation Tips for Fresh Produce

- Many precut, bagged produce items like lettuce are pre-washed. If so, **it will be stated on the packaging**. This pre-washed, bagged produce can be used without further washing.
- As an extra measure of caution, you can wash the produce again **just before you use it**. Precut or prewashed produce in open bags should be washed before using.
- Begin with clean hands. Wash your hands for 20 seconds with warm water and soap before and after preparing fresh produce.

    - **Cut away any damaged or bruised areas** on fresh fruits and vegetables before preparing and/or eating. Produce that looks rotten should be discarded.
    - All produce should be **thoroughly washed before eating**. This includes produce grown conventionally or organically at home, or produce that is purchased from a grocery store or farmer's market. Wash fruits and vegetables under running water just before eating, cutting or cooking.
    - **Even if you plan to peel** the produce before eating, it is still important to wash it first.
    - Washing fruits and vegetables with soap or detergent or using commercial produce washes is not recommended.
    - **Scrub firm produce,** such as melons and cucumbers, with a clean produce brush.
    - **Drying produce** with a clean cloth towel or paper towel may further reduce bacteria that may be present.

Health Risks and Raw Sprouts

Raw sprouts that are served on salads, wraps, and sandwiches may contain bacteria that cause foodborne illness. Rinsing sprouts first will not remove bacteria. Home-grown sprouts also present a health risk if they are eaten raw or lightly cooked.

To reduce the risk of illness, **do not eat raw sprout** such as bean, alfalfa, clover, or radish sprouts. All sprouts should be cooked thoroughly before eating to reduce the risk of illness.

This advice is particularly important for children, the elderly, and persons with weakened immune systems, all of whom are **at risk of developing serious illness** due to foodborne illness.

Separate for Safety

Keep fruits and vegetables that will be eaten raw **separate from other foods** such as raw meat, poultry or seafood - and from kitchen utensils used for those products.
In addition, be sure to: **Wash cutting boards, dishes, utensils and counter tops** with hot water and soap between the preparation of raw meat, poultry and seafood products and the preparation of produce that will not be cooked.

For added protection, **kitchen sanitizers** can be used on cutting boards and counter tops periodically. Try a solution of one teaspoon of chlorine bleach to one quart of water.

If you **use plastic or other non-porous cutting boards**, run them through the dishwasher after use.

Fruit and Vegetable Juices

Safety and Fresh-Squeezed Products

Most of the juices sold in the United States are processed (for example, "pasteurized") to kill harmful bacteria. But when fruits and vegetables are fresh-squeezed and left untreated, harmful bacteria from the inside or the outside of the produce can become a part of the finished product.

- Some grocery stores, health food stores, cider mills, and farm markets sell packages and containers of juice that were made on site and **have not been pasteurized** or otherwise treated to kill harmful bacteria.
- These untreated products should be **kept in the refrigerated section** of the store or on ice, and **must have the following warning on the label** regarding people who are at risk for foodborne illness:

> WARNING: This product has not been pasteurized and therefore may contain harmful bacteria that can cause serious illness in children, the elderly, and persons with weakened immune systems.

- Juices that are **fresh squeezed and sold by the glass** - such as at farm markets, at roadside stands, or in some restaurants or juice bars - may not be pasteurized or otherwise treated to ensure safety. Warning labels are not required for these products.
- If you or someone in your family is at risk for foodborne illness, and you cannot determine if a juice has been processed to destroy harmful bacteria, either **don't drink it or bring it to a boil** to kill any harmful bacteria that may be present.

Those at risk for foodborne illness should not drink unpasteurized juice unless it is brought to a boil first.

Questions and Answers about Fresh Produce

What is “organic produce”?
Organic produce is grown without using most conventional pesticides; fertilizers made with synthetic ingredients or sewage sludge; bioengineering; or ionizing radiation.
Before a product can be labeled "organic," a **government-approved certifier** inspects the farm where the food is grown to make sure the farmer meets the U.S. Department of Agriculture's organic standards. Companies that handle or process organic food before it reaches the supermarket or restaurant must be certified, too.

What is ethylene gas – and does it effect produce?
Some fruits and vegetables - like bananas - **naturally produce ethylene gas** when they ripen. Often, fruits and vegetables are harvested in the unripened state, and in order to preserve firmness and to increase shelf life; they are later exposed to ethylene gas to induce ripening.

What does the “use-by” date mean on a package of fresh produce?
A "Best-If-Used-By- (or Before)" date is the last date recommended for peak quality as determined by the manufacturer of the product.

Why are wax coatings used on fruits and vegetables?
Many vegetables and fruits make their own natural waxy coating. After harvest, fresh produce may be washed to clean off dirt and soil - but such washing also removes the natural wax. Therefore, waxes are applied to some produce to replace the natural waxes that are lost.
Wax coatings help retain moisture to maintain quality from farm to table including:

- when produce is **shipped** from farm to market
- while it is **in the stores and restaurants**
- once it is **in the home**

Waxes also help inhibit mold growth, protect produce from bruising, prevent other physical damage and disease, and enhance appearance.

How are waxes applied?
Waxes are used only in tiny amounts to provide a microscopic coating surrounding the entire product. Each piece of waxed produce has **only a drop or two** of wax.
Coatings used on fruits and vegetables **must meet FDA food additive regulations** for safety. Produce shippers and supermarkets in the United States are required by federal law to label fresh fruits and vegetables that have been waxed so you will know whether the produce you buy is coated. Watch for signs that say: "Coated with food-grade vegetable-, petroleum-, beeswax-, or shellac- based wax or resin, to maintain freshness."

How the FDA Works to Keep Produce Safe

FDA Consumer magazine, U.S. Food and Drug Administration
March-April 2007
Accessed: October 1, 2007 http://www.fda.gov/fdac/features/2007/207_foodsafety.html

The contamination of fresh spinach with the bacteria *Escherichia coli (E. coli)* O157:H7 during the fall of 2006 led to one of the largest and deadliest outbreaks of foodborne illness in recent years.

Most of the illnesses due to *E. coli* occurred from Aug. 26, 2006, to Sept. 16, 2006. Illnesses from spinach were confirmed in 26 states, and one case was confirmed in Ontario, Canada. In all, nearly 205 cases of illness were recorded during the outbreak, including 31 involving a type of kidney failure called hemolytic uremic syndrome (HUS). More than 100 people were hospitalized, and three deaths were recorded, including a 2-year-old boy in Idaho.

"One foodborne illness is too many," says Robert Brackett, Ph.D., director of the Food and Drug Administration's Center for Food Safety and Applied Nutrition (CFSAN). "We've seen that there is no such thing as a small error when it comes to produce safety. Even what may be perceived as a small error can have disastrous consequences."

Fresh produce is especially vulnerable to contamination because it's grown in a natural environment. It may be grown in a field or orchard, and it is often consumed raw, without cooking or other treatments that could destroy bacteria and other pathogens.

The FDA works with many partners to prevent contamination, but it's impossible to eliminate all problems through prevention. "When there is a problem, we want to catch it early and contain it through efficient outbreak response," says David Acheson, M.D., director of food safety and security in the CFSAN. "In this case, the FDA mounted a collaborative effort with public health authorities throughout the country to identify the source of the problem and prevent its spread."

The CFSAN has the lead responsibility for ensuring food safety, regulating everything except meat, poultry, and processed egg products, which are regulated by the U.S. Department of Agriculture (USDA). The Centers for Disease Control and Prevention (CDC) has a complementary role, serving as the lead federal agency for conducting disease surveillance and outbreak investigations. Surveillance systems coordinated by the CDC, in collaboration with the states, provide an essential early-information network to detect dangers in the food supply.

Detecting an Outbreak

When a patient is diagnosed with *E. coli* O157:H7, a sample of the bacterial strain is sent to a participating PulseNet lab, says Christopher Braden, M.D., chief of outbreak response and surveillance at the CDC. PulseNet is a national network of public health laboratories that perform genetic fingerprinting on foodborne bacteria that result in human illness. Scientists use a process called pulsed-field gel electrophoresis (PFGE), a technique that subtypes bacteria.

"After the bacterial strain is subtyped or 'DNA fingerprinted' at a lab, the fingerprint is then uploaded electronically to the national PulseNet database where it can be compared with other patterns in other states," Braden says. "This gives us the capability to rapidly detect a cluster of infections with the same pattern occurring in multiple states. The strength of this system is its ability to identify patterns even if the affected people are geographically far apart."

Epidemiologists in Wisconsin were the first to alert CDC officials about a small cluster of *E. coli* O157:H7 infections on Sept. 8, 2006. At that time, the source of the problem was unknown. Wisconsin posted the bacterial strain to PulseNet to alert the entire network. PulseNet confirmed that *E. coli* strains from infected patients in Wisconsin had matching PFGE patterns and identified the same patterns in other states.
"Once a cluster of cases with the same DNA pattern is identified, epidemiologists interview patients to determine whether cases of illness are linked to a food source or what other exposures they have in common," Braden says.

Oregon's state health department also had noted a small cluster of cases and began interviewing patients. On Sept. 13, 2006, Wisconsin and Oregon health officials both notified the CDC that eating fresh spinach was reported. Most of those interviewed reported eating prepackaged raw spinach that came from a bag.
That same day, the CDC Director's Emergency Operations Center notified the FDA's Emergency Operations Center (EOC) of the possible association of prepackaged raw spinach to the illnesses. The FDA's EOC is the agency's focal point for coordinating and managing all emergencies involving products regulated by the FDA.

Alerting the Public
After learning from the CDC that fresh spinach was confirmed as the source of the outbreak, the FDA immediately took action to prevent further illness by alerting the public. On Sept. 14, 2006, the FDA and the CDC held a conference call with the states and issued a public alert, advising consumers not to eat bagged spinach at that time. Neither frozen nor canned spinach was implicated in the outbreak.

Those who had become ill reported eating various brands of bagged spinach, processed by Natural Selection Foods LLC of San Juan Bautista, Calif. One week after Wisconsin officials notified the CDC, Natural Selections, which bags spinach under several brand names, announced a voluntary recall. The company recalled all spinach products with a date code of Oct. 1 or earlier. Five more companies issued recalls between Sept. 15 and Sept. 22. "These secondary recalls occurred because Natural Selections had shipped spinach to other companies that repackaged it," Acheson says.

The companies that issued secondary recalls were RLB Food Distributors, L.P., of West Caldwell, N.J.; River Ranch Fresh Foods LLC of Salinas, Calif.; Kenter Canyon Farms Inc. of Sun Valley, Calif.; Triple B Corp., doing business as S.T. Produce of Seattle; and Pacific Coast Fruit Co. of Portland, Ore.

On Sept. 16, the FDA expanded its warning and advised consumers not to eat any fresh spinach or fresh spinach-containing products. "We expanded the advisory when we learned that bagged spinach was sometimes sold in an un-bagged form at the retail level," Brackett says. The FDA advised retailers and food service operators that they should not sell raw spinach or blends that may contain raw spinach.

"We were also concerned about fresh spinach products that could still be in consumers' refrigerators," Brackett says. "At that point, the priority was to prevent further illnesses. We wanted to get the word out and get fresh spinach off the shelves while we conducted an investigation to narrow down the source. The number of illnesses was increasing daily, which was alarming. And the reach was nationwide. We also knew that there were a significant number of severe illnesses and hospitalizations."

E. coli O157:H7 causes diarrhea, often with bloody stools. Though most people recover in a week, some are more vulnerable, especially very young children and older people. Of the 95 cases that had been reported by Sept. 15, 2006, almost half had been hospitalized, and 15 percent had HUS, a condition that can cause kidney damage and death.

The FDA's advice to not eat any fresh spinach remained in effect until Sept. 22, 2006, Brackett says, when the FDA became confident that the source of the tainted spinach was restricted to three California counties. On that day, the FDA advised the public that fresh spinach implicated in the outbreak was grown in Monterey, San Benito, and Santa Clara Counties. At the same time, the FDA said that spinach grown elsewhere was not implicated in the outbreak and could be consumed.

The Trace-Back Investigation

From the first indications that fresh spinach was the culprit in the fall 2006 outbreak, investigators from the FDA, the CDC, and the states worked together to trace the implicated spinach back from consumption to the fields. The fact that illnesses were reported in multiple states suggested that contamination likely happened early in the distribution chain.

"Traceability to the farm is absolutely critical," says Jeff Farrar, D.V.M., Ph.D., chief of the Food and Drug Branch in the California Department of Health Services (CDHS). "We have seen many processors in the past who believed they had state-of-the-art traceability systems and when outbreaks occur, they realize their systems are not nearly as good as they thought."

On Sept. 14, 2006, Erica Pomeroy, an investigator in the San Francisco District of the FDA's Office of Regulatory Affairs, was already in the Salinas Valley with James Sigl, a senior investigator with the CDHS. The Salinas Valley is in the central coast region of California, about 55 miles south of San Jose and 20 miles northeast of Monterey.

"We were there conducting an assessment of a grower when we got a call that we needed to go to Natural Selections to start an investigation," Pomeroy says. They were in the area as part of the FDA's Lettuce Safety Initiative, which calls for assessments of growing and harvesting practices in major growing areas of leafy greens during September and October—months when outbreaks have occurred in the past. It took Pomeroy and Sigl about 45 minutes to drive to Natural Selections, where they reviewed the spinach washing and packaging process and collected documents from the company to determine which fields should be investigated.

Serving as team leaders for the investigation, they set up a command center at a hotel near the Salinas Valley. They were soon joined by other members of the California Food Emergency Response Team (CalFERT), a collaboration between the FDA's Pacific Region and the CDHS. CalFERT includes a diverse team of investigators, food scientists, environmental scientists, microbiologists, and chemists.

"Having the right people with the right skills available on site is critical to any successful investigation," says Barbara Cassens, the FDA's San Francisco district director. "By training the CalFERT staff together and offering them an opportunity to develop a working relationship prior to an emergency, we were able to move quickly in this outbreak response."

Pomeroy says the command center served as a place where they could have computer access and convene to share information, review findings, and plan strategies. "By focusing on fields associated with certain production lots, we were able to narrow the search to nine different ranches in the area," Pomeroy says. "We interviewed harvesters and growers about growing practices, irrigation practices, and their workers. We collected samples in and around the suspect fields from every possible source

of contamination—water, soil, and domestic and wild animal feces." Labs of the FDA, the CDHS, and the USDA were able to process about 900 samples in a relatively short time.

And while investigators were conducting investigations on the farm level, other experts continued to analyze data collected in spinach questionnaires of people who had gotten ill. "The FDA collaborated with CDC to design a spinach questionnaire, a tool used to elicit a detailed history of spinach consumption from people who became ill," says Karl Klontz, M.D., a medical officer in the CFSAN. "We worked with CDC to analyze data collected using information such as brand name, date of purchase, Universal Product Code (UPC) code, and lot numbers."

A Break in the Case

On Sept. 20, 2006, a big break came when New Mexico's public health laboratory announced that it had isolated the outbreak's strain of *E. coli* O157:H7 from an open package of spinach that came from the refrigerator of a patient who had become ill. "The package of spinach that tested positive was Dole baby spinach best if used by August 30," Klontz says. This was a tremendous help in tracing back to the fields. Later, the strain implicated in the outbreak also was isolated from open packages of fresh spinach consumed by ill people in several other states, including Utah, Pennsylvania, Colorado, Ohio, and Wisconsin.

In the end, the focus of the trace-back investigation narrowed to four fields on four different ranches. On Sept. 29, 2006, the FDA announced that all spinach implicated in the outbreak traced back to Natural Selection Foods.

Possible Routes of Contamination

The investigation into how the spinach may have become contaminated included sample collection in facilities and a review of animal management practices, processing practices, and water use. Richard Gelting, Ph.D., an environmental engineer from the CDC's National Center for Environmental Health, was deployed to California at the FDA's request to join in the investigation of possible environmental sources of contamination. He investigated irrigation well structure, ground water movement, and water management practices in the implicated farm regions.

On Oct. 12, 2006, the FDA and the state of California announced test results. The field investigation discovered the same strain of *E. coli* O157:H7 involved in the illnesses in environmental samples collected at one of four implicated ranches that supplied spinach to Natural Selection. The samples included water from a stream and cattle feces taken from pasture areas on the ranch outside the crop fields. The *E. coli* O157:H7 isolates from these samples were matched to the outbreak strain by their PFGE patterns. Wild pig feces collected by investigators on the ranch were also found to contain this same strain of *E. coli* O157:H7.

"One unusual finding on the ranch was a high population of wild pigs," says Farrar. "But we haven't determined conclusively that wild pigs were the source of the contamination. Finding an exact-matching *E. coli* strain on an implicated farm is a first in California, and it directly reflects the CALFERT approach. But we still don't know how the pathogen came into contact with the spinach."

Fencing around the cow pastures nearby appears to keep the cows from going into the spinach fields. But Gerald Wiscomb, an expert on the team from the USDA's Wildlife Services, observed during his behavioral studies that pigs go into the crop fields on the ranch. "There are many possibilities," Pomeroy says. "It could be that the pigs rooted around the cow feces, contaminating themselves, and then later defecated in the spinach fields." Another possibility is that surface contamination from pig and cow feces in the pasture areas got into the ground water.

More research is needed to better understand how *E. coli* O157:H7 is introduced into the environment, says Farrar. "We need a better understanding of how the organism survives, whether it grows in certain conditions, exactly how it comes into contact with ready-to-eat products, and how it's affected by current processing practices," he says.

History of Outbreaks in the Salinas Valley

Produce-related outbreaks have been a continuing problem in recent years. Since 1995, there have been 20 outbreaks involving leafy greens, most traced to California. Many, but not all, were traced to the Salinas Valley. But there aren't definitive answers as to why many of these outbreaks are linked to the Salinas Valley, according to experts.

"Some have speculated that the reason other areas have not been implicated is simply because of the difference in the volume of production," Farrar says. "The Salinas Valley produces much more leafy greens than any other area in the country so we may be more likely to see outbreaks from this area. Others believe there are one or more unidentified geographic, topographic, or environmental risk factors unique to Salinas Valley that result in systemic contamination with *E. coli* O157:H7."

In a recent multiagency investigation project, the CDHS discovered many *E. coli* O157:H7 positive findings in agricultural ditch water in many area locations. This is the runoff water originating in the hills surrounding the Salinas Valley. Although none of these isolates have matched any known outbreak strains, these findings have resulted in a grant from the USDA's Agricultural Research Service to the University of California at Davis (UC-Davis) and the CDHS to look further into environmental sources of contamination in this area.

Industry and FDA Action

In 2004 and 2005, the FDA wrote to industry to express both the agency's concerns with continuing outbreaks and its expectations for industry to improve produce safety. One letter to the lettuce and tomato industries in February 2004 encouraged industry to review practices in light of the FDA's Good Agricultural Practices (GAPs) and Good Manufacturing Practices (GMPs) guidance. Another letter, sent in November 2005, reiterated this concern and focused on fresh-cut lettuce and other leafy greens.

After the most recent spinach outbreak, the FDA and the state of California asked the produce industry to develop a comprehensive plan to minimize the risk of another outbreak due to *E. coli* in spinach grown in California.

The Grower-Shipper Association of Central California, the Produce Marketing Association, the United Fresh Produce Association, and the Western Growers Association pledged their commitment and submitted a draft plan to the FDA.

Implementation of this plan is voluntary, but the FDA and the state of California may institute regulatory requirements if it is determined that they are needed.

The Public Health Service Act authorizes the FDA to make and enforce regulations to prevent the introduction, transmission, or spread of communicable disease. And the Federal Food, Drug, and Cosmetic Act provides a broad statutory framework for federal regulation to prevent adulterated foods from entering commerce, and to ensure that human food will not be hazardous to health.

Farrar says that industry also has proposed the creation of a statutorily based "Marketing Order and Marketing Agreement" on the state level for growers and processors as a possible avenue. "We are

familiarizing ourselves with this proposal for mandatory and uniform standards for leafy greens industry in California that would be administered under the California Department of Agriculture's statutory authority," he says.

The FDA and the state of California have reiterated previous concerns and advised firms to review their operations in light of the FDA's guidance for minimizing microbial food safety hazards, as well as other available information regarding the reduction or elimination of pathogens on fresh produce.

Charles Sweat, chief operating officer of Natural Selection Foods, announced that his company will require a number of measures be taken by growers that supply their company with the fresh-cut produce that they pack. These measures include working with growers from seed to harvest, inspecting the seed, irrigation water, soil, plant tissues, and wildlife. The company also indicated that sanitation protocols for farm equipment and packaging supplies will be enhanced and monitored, and that a "firewall" will be set up to test all the freshly harvested greens before they enter the production stream.

"Clearly things have to change throughout the leafy greens industry and the changes need to occur quickly," Farrar says. "We have relayed to industry that the solution must include specific, measurable, enforceable on-farm food safety practices that are based on the best science that's available now."

According to GAP guidelines, areas that should be considered to minimize the potential for microbial contamination of produce include

- agricultural water used for irrigation or crop protection sprays
- wild and domestic animals
- worker health and hygiene
- the production environment, which includes the use of manure, previous land use, and use of adjacent land
- post-harvest water used to wash or cool produce
- sanitation of facilities and equipment.

The Produce Safety Plan

The FDA instituted a Produce Safety Action Plan in 2004. The action plan builds on previous guidance and addresses microbial food safety hazards and good agricultural and management practices common to growing, harvesting, washing, sorting, packing, and transporting of most fruits and vegetables sold to consumers in an unprocessed or raw (minimally processed) form.
The plan contains four objectives: preventing contamination of fresh produce with pathogens; minimizing the public health impact when contamination of fresh produce occurs; improving communications with producers, preparers, and consumers of fresh produce; and facilitating and supporting research relevant to fresh produce.

"A significant change is that we've gone from a broader-scope guidance in the past to more commodity specific guidance," says Nega Beru, Ph.D., director of the CFSAN's Office of Plant and Dairy Foods. "Certain commodities account for most of the foodborne outbreaks associated with produce."

As part of the plan, the FDA has provided technical assistance to help industry develop food safety guidance for five commodity groups: cantaloupes, lettuce and leafy greens, tomatoes, green onions,

and herbs. The guidelines for cantaloupes, tomatoes, and lettuce have been finalized and are available. With FDA assistance, industry work on guidances for herbs and green onions is ongoing.

In March 2006, the agency released draft guidance for the fresh-cut produce industry. The agency is working to finalize its "Draft Guidance to Minimize Microbial Food Safety Hazards of Fresh-Cut Fruits and Vegetables." The Lettuce Safety Initiative, developed in August 2006, supports the produce safety plan and covers lettuce and other leafy greens, including spinach.

In August 2006, the FDA met with Virginia officials to discuss outbreaks associated with tomatoes produced on the Eastern shore of Virginia. The FDA worked with the Florida Tomato Exchange and the University of Florida's Institute of Food and Agricultural Sciences to arrange a forum, held in November 2006, to discuss improving tomato safety. Also in November 2006, the FDA announced results of an investigation by state and CDC investigators which found that consuming tomatoes in restaurants was the cause of illnesses of *Salmonella Typhimurium*. Twenty-one states reported 186 cases of illness to the CDC.

"Produce safety is the number one priority in CFSAN right now," Brackett says. "Our role is to serve as a leader in providing direction for industry and to apply the best science-based approaches toward building an even safer food supply. As a result of effective collaboration with our public health partners, the American food supply continues to be among the safest in the world. But we also know that we must continue to work on reducing the incidence of foodborne illness to the lowest level possible."

E. coli Outbreaks at Taco Bell and at Taco John's

On Dec. 14, 2006, the Centers for Disease Control and Prevention (CDC) announced that the *Escherichia coli (E. coli)* O157:H7 outbreak linked to Taco Bell Restaurants in northeastern states appeared to be over. Based on a number of factors, shredded iceberg lettuce is considered overall to be the single most likely source of the outbreak at this time. The FDA announced that it continues to narrow its investigation by focusing efforts on finding the sources of shredded iceberg lettuce served at the restaurants.

The peak of the outbreak occurred from the last week of November until the beginning of December. A total of 71 cases in five states were reported to the CDC: Delaware (two cases), New Jersey (33 cases), New York (22 cases), Pennsylvania (13 cases), and South Carolina (one case—this person ate at a Taco Bell in Pennsylvania). Fifty-three hospitalizations and eight cases of hemolytic uremic syndrome (HUS) have been reported. HUS can cause permanent kidney damage and death.

FDA investigators reviewed Taco Bell's records in order to trace the distribution channels of the iceberg lettuce and identify the farm or farms where the lettuce was grown, as well as all the firms and facilities that handled the product. This outbreak has been traced to California's Central Valley.

In January 2007, the agency also announced that it had moved closer to identifying the source of illness for an outbreak of *E. coli* O157:H7 at Taco John's Restaurants in Iowa and Minnesota. The FDA and the state of California, working with state health officials in Minnesota, Iowa, and Wisconsin, have DNA-matched the strain of *E. coli* O157:H7 bacteria associated with the outbreak with two environmental samples gathered from dairy farms near a lettuce-growing area in California's Central Valley. The outbreak sickened 81 people in November and December 2006. Illnesses were reported in Minnesota (33), Iowa (47), and Wisconsin (one). Twenty-six people were hospitalized, and two suffered from HUS. No deaths have been associated with the outbreak.

Produce Safety Tips

In light of recent contaminated produce outbreaks, the FDA is emphasizing advice to consumers on how to reduce the risk of foodborne illnesses from fresh produce.

Buying

- Purchase produce that is not bruised or damaged.
- When selecting fresh-cut produce - such as half a watermelon or bagged mixed salad greens—choose only those items that have been refrigerated or surrounded by ice.
- Bag fresh fruits and vegetables separately from meat, poultry, and seafood products when packing them to take home from the market.

Storage

- Strawberries, lettuce, herbs, mushrooms, and other perishable fruits and vegetables can best be maintained by storing in a clean refrigerator at a temperature of 40 degrees F or below. If you're not sure whether an item should be refrigerated to maintain quality, ask your grocer.
- All produce that is purchased pre-cut or peeled should be refrigerated within two hours to maintain both quality and safety.
- Keep refrigerators set at 40 degrees F or below. Use a refrigerator thermometer to check!

Preparation

- Many pre-cut, bagged produce items like lettuce are pre-washed. If so, it will be stated on the packaging. This pre-washed, bagged produce can be used without further washing.
- As an extra measure of caution, you can wash the produce again just before you use it. Pre-cut or pre-washed produce in open bags should be washed before using.
- Begin with clean hands. Wash your hands for 20 seconds with warm water and soap before and after preparing fresh produce.
- Cut away any damaged or bruised areas on fresh fruits and vegetables before preparing or eating. Produce that looks rotten should be discarded.
- All unpacked fruits and vegetables, as well as those packaged and not marked pre-washed, should be thoroughly washed before eating. This suggestion includes produce grown conventionally or organically at home, or produce that is purchased from a grocery store or farmer's market. Wash fruits and vegetables under running water just before eating, cutting, or cooking.
- Even if you plan to peel the produce before eating, it is still important to wash it first.
- Washing fruits and vegetables with soap or detergent or using commercial produce washes is not recommended.
- Scrub firm produce, such as melons and cucumbers, with a clean produce brush.
- Drying produce with a clean cloth towel or paper towel may further reduce bacteria that may be present.

Separation

- Keep fruits and vegetables that will be eaten raw separate from other foods, such as raw meat, poultry, or seafood, and from kitchen utensils used for those products.
- Wash cutting boards, dishes, utensils, and countertops with hot water and soap between the preparation of raw meat, poultry, and seafood products and the preparation of produce that will not be cooked.
- For added protection, kitchen sanitizers can be used on cutting boards and countertops periodically. Try a solution of one teaspoon of chlorine bleach to one quart of water.
- If you use plastic or other nonporous cutting boards, run them through the dishwasher after use.

For More Information

- Safe Handling of Raw Produce and Fresh-Squeezed Fruit and Vegetable Juices http://www.cfsan.fda.gov/~dms/prodsafe.html
- FDA Issues Final Guidance For Safe Production of Fresh-Cut Fruits And Vegetables (Press Release, March 12, 2007) http://www.fda.gov/bbs/topics/NEWS/2007/NEW01584.html
- The FDA page on E. coli Outbreaks http://www.fda.gov/oc/opacom/hottopics/EcoliOutbreaks/restaurants.html
- The CDC page on E.coli Outbreaks http://www.cdc.gov/ecoli/
- www.fightbac.org http://www.fightbac.org/
- www.foodsafety.gov http://www.foodsafety.gov/

FDA Consumer magazine http://www.fda.gov/fdac/default.htm

The FDA: Fresh Leafy Greens Grown in the United States Are Safe

FDA Consumer magazine, November-December 2006, U.S. Food and Drug Administration
Accessed: October 1, 2007 http://www.fda.gov/fdac/features/2006/606_greens.html

Every year, there are many thousands of pounds of fresh leafy greens, such as lettuce and spinach, grown in the United States and eaten by the public with no consequent illness. Outbreaks, however, such as the recent *Escherichia coli (E. coli)* O157:H7 outbreak linked to raw spinach, do occur, and there is a need to do everything possible to minimize the likelihood of further outbreaks and to prevent serious illness. The Food and Drug Administration has taken a number of actions in recent years, in partnership with other government agencies, to improve the safety of fresh leafy greens and is working on additional steps. From farm to table, everyone, including growers, processors, distributors, retailers and consumers, and government, has a responsibility to ensure food safety.

The FDA believes there is a need to examine and improve certain agricultural practices to minimize the risk of *E. coli* O157:H7 contamination of leafy greens. The FDA and the State of California launched the Lettuce Safety Initiative in August 2006 to minimize such risk and to create greater awareness by industry of the FDA's commitment to food safety and concern about the safety of lettuce. This initiative has since been broadened to include spinach and other leafy greens.

The initiative has a number of key objectives, including assessing current industry approaches and stimulating new efforts to improve lettuce safety; identifying industry practices that potentially lead to product contamination and developing policy or guidance and identifying research to minimize future outbreaks; taking targeted regulatory action using a risk-based approach toward areas most likely to be the source of contamination; and alerting consumers early and responding rapidly in the event of an outbreak.

The FDA, the State of California, the Centers for Disease Control and Prevention (CDC), and the U.S. Department of Agriculture (USDA) continue to investigate the cause of the spinach outbreak. This investigation includes continued inspections and sample collection in facilities, the environment, and water, as well as studies of animal management, water use, and the environment.

According to the FDA, all spinach implicated in the September 2006 outbreak has traced back to Natural Selection Foods LLC of San Juan Bautista, CA. This determination is based on epidemiological and laboratory evidence obtained by multiple states and coordinated by the CDC. Natural Selection Foods issued a recall of all implicated products on Sept. 15, 2006. Four other companies have issued secondary recalls because they received the recalled product from Natural Selections.

The FDA and the State of California have previously expressed serious concern with the continuing outbreaks of foodborne illness associated with the consumption of fresh and fresh-cut lettuce and other leafy greens.

The FDA will be holding a public meeting to address the larger issue of foodborne illness linked to leafy greens once the current investigation is complete.

Consumers are advised that proper storage of fresh produce can affect both quality and safety. To maintain quality of fresh produce, certain perishable fresh fruits and vegetables (like strawberries, lettuce, herbs, and mushrooms) can be best maintained by storing in a clean refrigerator at a temperature of 40°F or below. All produce that is purchased pre-cut or peeled should be refrigerated to maintain both quality and safety.

Processed spinach (e.g., frozen and canned spinach) was not implicated in the September 2006 outbreak.

For More Information
FDA Center for Food Safety and Applied Nutrition: http://www.cfsan.fda.gov/
FDA Consumer Magazine: http://www.fda.gov/fdac/default.htm

Avian Influenza: Food Safety Issues

Last Updated 27 April 2007 Accessed: October 1, 2007 http://www.who.int/foodsafety/micro/avian/en/print.html

Introduction

On-going outbreaks of highly pathogenic H5N1 avian influenza in poultry in Asia and, more recently, in Europe and Africa have raised concerns about multiple sources of infection and the risk to humans from various exposures. On present evidence, the vast majority of human cases have acquired their infection following direct contact with infected live or dead poultry. WHO is aware of concerns that the virus could also spread to humans through contact with contaminated poultry products. To date, no epidemiological data suggest that the disease can be transmitted to humans through properly cooked food (even if contaminated with the virus prior to cooking). However, in a few instances, cases have been linked to consumption of dishes made of raw contaminated poultry blood.

The Department of Food Safety, Zoonoses and Foodborne Diseases of WHO has developed a series of guidance documents to address the concerns related to food safety and food handling with recommendations to maintain the safety of the food supply in and outside avian influenza outbreak area. The INFOSAN notes below have been disseminated through the International Food Safety Authorities Network (INFOSAN). The recommendations on proper food handling and cooking included in these notes are based on the WHO 5 keys for safer food.

Foreword

The epizootic of the highly pathogenic A/H5N1 avian influenza virus that started affecting domestic and wild birds and humans in South-East Asia in mid-2003, and has spread to the rest of Asia, Africa, and Europe, is the largest and most severe outbreak on record. Previously, outbreaks of highly pathogenic avian influenza in poultry and wild birds were rare. Since December 2003, more than 50 countries in Africa, Asia, Europe and the Middle East have reported outbreaks of H5N1 avian influenza in poultry and/or wild birds. More than ten countries have also reported human H5N1 influenza cases.

Before the recent outbreaks in Hong Kong (1997) and in the Netherlands (2003), human infection with avian influenza viruses were rarely reported and usually resulted in mild disease. The widespread persistence of H5N1 in poultry populations poses two main risks for human health: (Sporadic human infections with the H5N1 avian influenza and (2) emergence of a pandemic influenza strain.

Of the few avian influenza viruses that have crossed the species barrier to infect humans, H5N1 has caused the largest number of cases of severe disease and death in humans. Unlike normal seasonal influenza, where infection causes self-limited respiratory symptoms in most people, the disease caused by H5N1 follows an unusually aggressive clinical course, with rapid deterioration and high fatality.

A second risk, of even greater global concern, is that the virus – if given enough opportunities – could change into a form that is highly infectious for humans and spreads easily from person to person. Such a change could mark the start of a global outbreak (a pandemic). Thus, preventing the human

pandemic requires control of the disease in animals and sensible precautionary measures to prevent human infection.

To prevent human disease, and especially to lower the risk of a human pandemic, this document aims to provide professionals with science-based answers to a number of common questions about avian influenza as related to animals, food and water. It addresses both the risks and associated preventive measures related to the transmission of the current H5N1 avian influenza virus (in relation to animal, food and water management); and the prevention of environmental transmission of a potential future pandemic human strain (with particular reference to hygiene and water/wastewater management).

More general information on avian and pandemic influenza is available on the WHO website: http://www.who.int/csr/disease/avian_influenza/en.

To start: what is the difference between seasonal, avian and pandemic influenza?

Seasonal influenza
Seasonal influenza is a highly infectious disease which spreads in humans around the world in seasonal epidemics, affecting 10% to 20% of the total population. The most important strains of human influenza virus are A and B. Influenza virus A has several subtypes, of which two, H1N1 and H3N2, are currently of epidemiological significance. WHO recommends annual immunization of at-risk persons as the best and most cost-effective strategy for reducing influenza-related morbidity and mortality.

Avian influenza
Avian influenza, or "bird flu", is a contagious disease caused by Influenza A viruses that normally infect only birds and, less commonly some mammals such as pigs. Avian influenza viruses can be highly species-specific, but have, on occasions, crossed the species barrier to infect humans and other mammals. The currently circulating H5N1 viruses represent a previously unrecognized type of avian influenza that is causing fatal infections in wild birds, domestic poultry, mammals like cats, and occasionally humans on a broad geographic scale.

Wild waterfowl are considered the natural reservoir of all non or low pathogenic influenza A viruses. They have probably carried influenza viruses, with no apparent harm, for centuries. However, in domestic poultry, infection with avian influenza viruses causes two main forms of disease, distinguished by low and high virulence. The so-called "low pathogenic" avian influenza (LPAI) commonly causes only mild symptoms (e.g. ruffled feathers, a drop in egg production) and may easily go undetected. The highly pathogenic avian influenza (HPAI) form is far more dramatic. It spreads very rapidly through poultry flocks, causes disease affecting multiple internal organs, and has a mortality that can approach 100%, often within 48 hours. Currently only some strains of viruses of the H5 and H7 subtypes are known to cause the highly pathogenic form of the disease in poultry.

Pandemic Influenza
A pandemic occurs when a new influenza virus emerges and starts spreading as easily as seasonal influenza – by coughing and sneezing. Because the virus is new, the human immune system will have no pre-existing immunity. This makes it likely that people who contract pandemic influenza will experience more serious disease than that caused by seasonal influenza.

An influenza pandemic is a rare but recurrent event. Only influenza A viruses have so far caused pandemics. Three pandemics occurred in the previous century: "Spanish influenza" in 1918, "Asian influenza" in 1957, and "Hong Kong influenza" in 1968. The 1918 pandemic killed an estimated 40–

50 million people worldwide. That pandemic, which was exceptional, is considered one of the deadliest disease events in human history. Subsequent pandemics were much milder, with an estimated 2 million deaths in 1957 and 1 million deaths in 1968.

In this publication we will only address the different aspects of avian influenza (in relation to animal, food and water management); and the prevention of environmental transmission of a potential future pandemic human strain (with particular reference to hygiene and water/wastewater management).

SECTION 1: ANIMALS AND FOOD

This section discusses the current H5N1 avian influenza epidemic in animals including domestic and wild animals that have been found to be infected with or involved in the transmission of the disease to humans. It also describes the safety of poultry and eggs which form an important part of the diet of people in all countries affected by the epidemic.

Which influenza viruses cause highly pathogenic disease in poultry?

Influenza A viruses exist in at least 16 H subtypes and 9 N subtypes. Only viruses of the H5 and H7 subtypes are known to cause the highly pathogenic form of the disease. However, not all viruses of the H5 and H7 subtypes are highly pathogenic and not all will cause severe disease in poultry.

On present understanding, H5 and H7 viruses are introduced to poultry flocks in their low pathogenic form. When allowed to circulate in poultry populations, the viruses can mutate into the highly pathogenic form. This is why the presence of an H5 or H7 virus in poultry is always cause for concern, even when the initial signs of infection are mild. Under the rules of the World Organization for Animal Health (OIE, http://www.who.int/foodsafety/micro/avian/en/www.oie.int), Member countries must report all instances of H5 or H7 avian influenza in poultry to the international community.

What is special about the current global spread of Avian Influenza A/H5N1?

The current outbreaks of highly pathogenic avian influenza, which began in South-East Asia in mid-2003, are the largest and most severe on record. Never before in the history of this disease have so many countries been simultaneously affected, resulting in the loss of so many birds.

The causative agent, the H5N1 strain of influenza virus, has proved to be especially tenacious. Despite ongoing control efforts, the virus continues to circulate in Asia, Africa, and Europe and has become firmly established in several countries. Control of the disease in poultry is expected to take many years. The H5N1 virus is also of particular concern for human health, as explained in the foreword.

Which countries have been affected by Avian influenza A/H5N1 outbreaks in poultry?

Since the beginning of the current outbreak, poultry outbreaks caused by the H5N1 virus have been reported in a growing number of countries in Asia, Europe and Africa. Updated maps of affected countries can be found on the WHO website:
http://gamapserver.who.int/mapLibrary/app/searchResults.aspx.

Where have human cases of Avian Influenza A/H5N1 occurred?

WHO updates regularly on its website information on the countries affected by human H5N1 avian influenza cases and details on individual human cases:
http://www.who.int/csr/disease/avian_influenza/en.

How do people become infected with Avian Influenza A/H5N1?
Direct contact with infected poultry, or surfaces and objects contaminated by their faeces, is presently considered the main route of human infection. To date, most human cases have occurred in rural or periurban areas where many households keep small poultry flocks, which often roam freely, sometimes entering homes or sharing outdoor areas where children play. As infected birds shed large quantities of virus in their faeces, opportunities for exposure to infected droppings or to environments

contaminated by the virus are abundant under such conditions. Moreover, because households in many countries depend on poultry for income and food, many families sell or slaughter and consume birds when signs of illness appear in a flock, and this practice has proved difficult to change. Exposure is considered most likely during slaughter, defeathering, butchering, and preparation of poultry for cooking. Ducks and other aquatic birds may present a special risk, they may be infected without showing any signs of disease.

Does the Avian Influenza A/H5N1 virus spread easily from birds to humans?
No. Despite the extension and duration of the outbreaks in animals presenting vast opportunities for animal to human exposure (in particular in areas where backyard flocks are common), the number of human H5N1 avian influenza cases remains very small. It is not presently understood why some people, and not others, become infected following similar 'high risk' exposures. Family genetic predisposition might play a role as a blood relationship has been found in most of the clusters of cases.

WILD BIRDS
What bird species are the main carriers of avian influenza?
Many wild bird species, especially those in wetlands and aquatic environments, harbour influenza viruses. Anseriformes (particularly ducks, geese and swans) and Charadriiformes (particularly gulls, terns, wadres) constitute the major natural reservoir for LPAI viruses. Transmission of avian influenza viruses between shore birds and wild ducks may occur when their breeding grounds overlap providing an opportunity for the mixing and recombination of different avian influenza virus subtypes. Avian influenza viruses are less common in birds more closely associated with human environments such as domestic chickens, turkeys, pheasants, pigeons and parrots.

Do migratory birds spread highly pathogenic avian influenza viruses to poultry?
Wild aquatic birds are considered the natural reservoir of all LPAI viruses. Unfortunately, the knowledge on LPAI in wild birds cannot be extrapolated to HPAI viruses. Therefore, the role of migratory birds in the spread of HPAI is not yet fully understood. Wild birds have probably carried influenza viruses, with no apparent harm, for centuries. Considerable circumstantial evidence suggests that migratory birds can introduce low pathogenic H5 and H7 viruses to poultry flocks. In some cases these viruses may then mutate in poultry to the highly pathogenic form.

Recent events suggest that in some cases, migratory birds are now directly spreading the Avian influenza A/H5N1 virus in its highly pathogenic form to regions not previously affected. However, there is currently no scientific basis for culling migratory and wild birds to control the outbreaks and prevent possible spread of Avian influenza A/H5N1. This measure should therefore be strongly discouraged and more emphasis should be put on further investigating other mechanisms for spread such as through legal or illegal trade of birds and poultry products Until virus circulation can be controlled where it occurs, further spread to new areas by both mechanisms can be expected.

Can migratory and wild birds transmit Avian influenza A/H5N1 to humans?
Avian influenza A/H5N1 is first and foremost a disease of poultry. Most human cases of H5N1 avian

influenza have occurred in rural or periurban areas where many households keep small domestic poultry flocks. However, defeathering or butchering of dead wild birds, especially waterfowl, is particularly hazardous in areas where Avian influenza A/H5N1 virus has been reported or is likely to occur, such as along migratory routes. The public should be advised to report, and avoid contact with, wild birds found dead

PIGEONS

Do pigeons carry and spread avian influenza viruses in nature?

The H5N1 avian influenza virus was isolated from one dead pigeon in Hong Kong in 2001, while all other birds sampled around the quarantine area, including 57 other pigeons, tested negative for the virus. In 2002, comparative studies involving pigeons and other bird species determined that pigeons were resistant or minimally susceptible to infection with avian influenza viruses. In 2003, various avian influenza viruses were isolated from 0.5% of the pigeons sampled in south central China. In 2006, a total of six individual pigeons were found infected with H5N1 avian influenza virus in Romania, Turkey and the Ukraine. These findings suggest that pigeons have played a minimal role in the spread of the virus. However, the latest studies conducted with the H5N1 avian influenza virus, which emerged in Asia in 2004, demonstrated an increased susceptibility of pigeons to this virus compared to the 1997 Hong Kong virus. Thus, the general public should try to avoid unnecessary close contact with pigeons, especially in places where pigeons congregate in large numbers.

PIGS

What role do pigs play in the current epidemic?

A study from Hong Kong (2005) experimentally infecting pigs with Avian influenza A/H5N1 2004 isolates from Vietnam and Thailand showed that pigs can be infected with highly lethal Asian H5N1 viruses but that these viruses are not readily transmitted between pigs under experimental conditions. A new large study from Korea on seroprevalence in pigs of different influenza strains could not identify any sero-epidemiological evidence of avian H5 and H9 influenza transmission to Korean pigs

In general, pigs can be easily infected by many human and avian influenza viruses and thereby provide an environment favourable for viral replication and genetic re-assortment. Until recently pigs were considered the most likely “mixing vessels” for the generation of a human pandemic strain of the avian influenza virus. Pigs have not played a role in the current epidemic of H5N1 avian influenza.

CATS AND OTHER MAMMALS

How do cats and other mammals get infected with the avian influenza virus?

Since 2003, several reports from South-East Asia and Europe confirmed infection of domestic cats, large wild felines in captivity and other mammals with the Avian influenza A/H5N1 virus. The wild felines involved in the outbreaks ate raw infected chicken carcasses, while the domestic cats are thought to have eaten, or come into contact with, infected dead or sick wild birds.

What are the effects of the avian influenza virus in cats?

The susceptibility of cats to infection by the H5N1 avian influenza virus has been clearly demonstrated. Three recent experimental studies have shown that a few days after infection cats develop severe clinical signs that can result in death. The H5N1 avian influenza virus is excreted from the pharynx and nose for several days after infection and can cause cat to cat transmission. Despite such recent experimental studies, major gaps in our knowledge remain and limit our ability to accurately assess the public health implications of infections in cats. Specifically, issues such as whether cats can excrete the virus without showing clinical signs, and whether cats can transmit the disease to other cats, poultry or humans, need to be studied.

What are the public health implications of infected cats and other mammals?
No human H5N1 avian influenza case has as yet been associated with a pet animal in any country, even in those countries where the virus has been present in birds for more than two years. Currently there is no scientific evidence to suggest that there has been sustained transmission of the Avian influenza A/H5N1 virus in cats or from cats to humans. In the absence of further data, an assessment

of whether cats are dead-end hosts of the H5N1 avian influenza virus or if they pose an additional public health risk is very difficult.

What can be done to prevent avian influenza infections in domestic cats and dogs?
Even domestic cats will eat small animals, including sick birds and poultry, and may become victims of any infection in this prey. To reduce the risks of the Avian influenza A/H5N1 virus infecting domestic cats in areas where the H5N1 avian influenza virus has been identified in domestic or wild birds, direct contact between cats or dogs and birds should be avoided, and any unusual morbidity or mortality in domestic animals should be closely monitored. Owners of cats and dogs in designated control and surveillance areas surrounding an Avian influenza A/H5N1 outbreak should control the movement of their pets. Cats and dogs should not be fed raw poultry meat in areas experiencing Avian influenza A/H5N1 outbreaks.

FOOD SAFETY AND FOOD HANDLING
Is it safe to slaughter chicken and handle dead chicken in outbreak areas?
In backyard production settings, the system of marketing live birds and the practices of home slaughtering, defeathering and eviscerating, create opportunities for extensive human exposure to potentially contaminated parts of poultry. Therefore, the wearing of protective gear, and practicing measures to prevent personal contamination, is essential. A large number of confirmed human cases are believed to have acquired their infection during the slaughtering or subsequent handling of diseased or dead birds prior to cooking. For this reason, such practices involving obviously diseased or dead birds must be stopped. In general, birds found dead or in a diseased-state should never be used for human consumption.

The H5N1 avian influenza virus spreads to virtually all parts of an infected bird, including blood, meat and bones. Avian influenza viruses survive in contaminated raw poultry meat and therefore can be spread through the marketing and distribution of contaminated food products, such as fresh or frozen meat. In general the viability of the avian influenza virus is maintained at low temperatures. The H5N1 avian influenza virus can survive in faeces for at least 35 days at 4°C and at least six days at 37°C. The virus has also been shown to survive on surfaces for several weeks at ambient temperatures.

In outbreak areas, some poultry species (such as domestic ducks) can be asymptomatic carriers of the virus. Vaccinated poultry can also carry the virus without showing symptoms. In these areas, it is important to effectively monitor the poultry population. In the absence of such monitoring systems, it is recommended that home-slaughtering be avoided. In non-outbreak areas, the likelihood of the virus being present in the poultry population is very low. Therefore, the likelihood of infected poultry being marketed and eventually handled by a consumer or a restaurant worker is considered to be very low. In this case, the public health risk related to avian influenza is negligible.

Is it safe to eat chicken?
Yes, though certain precautions should be followed in countries currently experiencing outbreaks. In

areas free of the disease, poultry and poultry products can be prepared and consumed as usual following good hygienic practices and proper cooking, with no fear of acquiring infection with the H5N1 virus.

In areas experiencing outbreaks, poultry and poultry products can also be safely consumed provided these items are properly cooked and properly handled during food preparation. The virus is inactivated at temperatures reached during conventional cooking (70 °C in all parts of the food - "piping" hot - no "pink" parts). To date, there is no epidemiological evidence that anyone has become

infected following the consumption of properly cooked poultry or poultry products. There have been reports of a few human cases potentially linked to the consumption of raw poultry parts (e.g., raw blood-based dishes). It should therefore be emphasized that the consumption of any raw poultry parts must be considered a high-risk practice and discouraged. In areas affected by Avian influenza A/H5N1 virus, handling of frozen or thawed raw infected poultry meat prior to cooking may be hazardous, if good hygienic practices are not observed. Standard hygienic handling practices should be used to prevent cross contamination:

- Separate raw meat from cooked or ready-to-eat foods to avoid contamination. Do not use the same chopping board or the same knife for raw meat and other foods. Do not handle both raw and cooked foods without washing your hands in between and do not place cooked meat back on the same plate or surface it was on before cooking. Do not use raw or soft-boiled eggs in food preparations that will not be heat treated or cooked.
- Keep clean and wash your hands. After handling frozen or thawed raw chicken or eggs, wash your hands thoroughly with soap. Wash and disinfect all surfaces and utensils that have been in contact with the raw meat.
- Cook thoroughly. Thorough cooking of poultry meat will inactivate the virus. Either ensure that the poultry meat reaches 70 °C at the centre of the product ("piping" hot) or that the meat is not pink in any part.

Is it safe to eat eggs?
Avian influenza A/H5N1 virus can be found inside and on the surface of eggs laid by infected birds. There is no epidemiological evidence to suggest that people have been infected with avian influenza through the consumption of eggs or egg products. Only proper cooking will inactivate virus present inside the egg. Eggs from areas with outbreaks in poultry should not be consumed raw or partially cooked (runny yolk) and the eggs should not be used as ingredients in foods which will not be cooked. Pasteurization or cooking of eggs will also significantly decrease the potential for transmission of other infections; (e.g. salmonellosis).

More information on the food safety aspects of avian influenza and the risks of handling infected poultry and poultry products can be found at:
http://www.who.int/foodsafety/micro/avian/en/index.html.

See the WHO food safety website for more information on the prevention of foodborne diseases:
http://www.who.int/foodsafety/consumer/5keys/en/.

SECTION 2: DRINKING-WATER AND SANITATION
This section aims to provide public health authorities, those involved in the management of water resources and supplies, those involved with patient care and the general public with answers to

common questions related to pandemic influenza planning as it affects drinking-water, sanitation, hygiene in healthcare settings and hygiene in domestic and community settings. By design, these answers are provisional due to the changing nature of the virus. The character of the pandemic

influenza virus may be very different from the H5N1 avian influenza virus which is currently producing disease in birds. The answers here relate to both the current H5N1 avian influenza virus and a potential future pandemic human strain. Additionally, a technical review paper (Review of latest available evidence on risks to human health through potential transmission of avian influenza (H5N1) through water and sewage) is available from the Water, Sanitation and Health Programme.

DRINKING-WATER

Could the avian influenza virus contaminate drinking-water sources?

Sources of drinking-water that may be susceptible to contamination with the avian influenza virus include surface water bodies (e.g. reservoirs, ponds, lakes and rivers), groundwater aquifers and rainwater collection systems. Of these sources, open water bodies where infected waterfowl gather are the most likely potential route of entry of virus into the drinking-water supply.

SANITATION

Avian influenza viruses are known to persist for extended periods of time in water, depending on temperature, pH and salinity. However, information on the persistence of highly pathogenic avian influenza viruses, including H5N1 avian influenza virus, in water is lacking. In general, the avian influenza virus viability in natural water (fresh, brackish and seawater) decreases with increasing salinity and increasing pH above neutral.

Due to their structure, all influenza viruses are relatively susceptible to disinfectants, including oxidizing agents such as chlorine. They are also readily inactivated by heating. Bacteria and other microorganisms may also play a role in virus inactivation.

Should any precautions be taken to avoid consuming virus-contaminated water?

The fact that waterfowl excrete influenza viruses into water does not confirm waterborne transmission between birds; nor does it offer an indication of the extent of the risk of infection to humans exposed to the water. Although there is no epidemiological evidence, the little evidence available regarding modes of transmission and infection suggests that the potential risk of human infection from water contaminated with the H5N1 avian influenza virus is small.

Prevention and control measures can be suggested to minimize, if not eliminate, the risk from the consumption of virus-contaminated water. If water from open water reservoirs is to be used for the supply of potable water then, as indicated in the WHO Guidelines for drinking-water quality, treatment is strongly recommended, specifically disinfection.

Authorities charged with managing any potential risk in drinking-water may consider ensuring that chlorine or alternative disinfectant be maintained throughout distribution. For effective disinfection of adequately pre-treated water, there should be a residual concentration of free chlorine of at least 0.5 mg/litre after a contact of 30 minutes (minimum) with the water at pH <8.0.

Where there is no access to community drinking-water treatment systems, and where household water safety is suspect, authorities should consider advising families to treat their drinking-water with

available and acceptable household-level interventions, including home chlorination (addition of bleach) or boiling. These interventions are effective at inactivating viruses.

How might the avian influenza virus be transmitted to humans from sewage, excreta and animal wastes?

The H5N1 avian influenza virus could potentially enter into sewage in urine or faeces excreted by infected humans or in animal waste that is combined with human sewage. Although human and animal excreta are often managed separately, there are settings and scenarios where animal waste may

be combined with human waste. There is some evidence to show that the H5N1 avian influenza virus is excreted in faeces of infected persons, but information on the excretion of H5N1 avian influenza viruses in urine or faeces by mammalian species, including humans, is very limited and unlikely to be representative of a potential future human pandemic strain.

HYGIENE IN HEALTH-CARE SETTINGS

Given the relatively small number of human cases to date, it is not surprising that information specific to H5N1 avian influenza virus persistence in sewage is lacking. The period of avian influenza infectivity in bird faeces and secretions depends primarily on the initial virus concentration, pH and temperature conditions, but, generally, four weeks after infection the avian influenza virus can no longer be detected.

The transmission of human influenza is commonly by aerosols (droplets and small particles in air) carrying the virus that enter the body through the nose or throat. Thus, other means of excreta disposal where aerosol formation is unlikely, such as latrines, probably represent an extremely low risk of virus transmission. The widespread use of untreated poultry faeces as fertilizer is, however, a possible risk factor.

What precautions should be taken with sewage?

To date, human infections with avian influenza viruses detected since 1997 have not resulted in sustained human-to-human transmission. However, national planning for pandemic influenza should include consideration of how to manage human sewage in outbreak areas where humans may excrete high levels of the virus.

Although there is no specific information available on the response of H5N1 avian influenza virus to wastewater treatment processes, virus concentrations are generally reduced at various rates and to various extents in both human and animal waste treatment processes, but the virus is typically not completely eliminated. Furthermore, virus concentrations may be enriched in certain treated or separated waste fractions (such as waste solids) by sedimentation and solid-liquid separation processes.

Providing that poultry house waste is not mixed with human sewage, there is currently little risk to sewage treatment workers. In the event of outbreaks of human infection with highly pathogenic avian influenza, human excreta could contain highly pathogenic avian influenza viruses and the exposure risks to sewage workers would need to be reconsidered.

In situations where exposure to potentially-infected poultry waste currently exists, there needs to be prevention and control measures in place to reduce airborne droplet and aerosol transmission.

PERSONAL HYGIENE

What is the role of hygiene in facilities treating patients infected with the avian influenza virus?

Presently, sound evidence on exact modes of human transmission of highly pathogenic avian influenza viruses is lacking. It is believed that multiple modes of transmission exist (large droplet, small particle aerosol, hand-contamination and self-inoculation, and possibly oral contamination), but their relative importance in sporadic highly pathogenic avian influenza infections is uncertain.

Furthermore, if the virus changes to become more readily transmissible from person to person, the importance of particular practices may change.

Given the uncertainty about the exact modes by which the avian influenza virus, including highly pathogenic avian influenza, may be transmitted between humans, enhanced infection control precautions for patients with suspected or confirmed avian influenza infection are warranted. There is

the need to minimize infection opportunities because every infection presents a chance of genetic mutation that might give rise to pandemic virus. In hospital settings, it is important to protect both patients and health-care workers from the avian influenza infection.

Strong hygiene practices are always a critical component of infection control. Of these practices, hand hygiene and surface cleaning are among the simplest and most cost-effective ways to prevent transmission of the highly pathogenic avian influenza virus.

What hygiene practices require specific attention?
Hand hygiene is a prerequisite to prevent the transmission of many infectious diseases. In environments where the highly pathogenic avian influenza virus may be present, hand hygiene, which includes hand washing and the use of alcohol-based hand rubs, is critical to prevent possible viral inoculation of the nose, mouth and conjunctivae by contaminated hands. Hand hygiene is also necessary to prevent the transmission of nosocomial infections to other patients and healthcare workers. Pathogens are removed by the mechanical action of hand washing. Alcohol disinfects (kills the pathogens). If hands are visibly dirty, washing with soap and water is required prior to disinfection. Otherwise, alcohol-based preparations or washing are both appropriate.

- Cover your mouth and nose with a tissue when coughing or sneezing.
- Wash your hands often, especially: before, during, and after you prepare food; before you eat; after you use the toilet; after handling animals or animal waste; when your hands are dirty; and more frequently when someone in your home is sick.
- Avoid touching your eyes, nose or mouth. Infections are often spread when a person touches something that is contaminated with microorganisms and then touches his or her eyes, nose, or mouth.

For soiled surfaces, cleaning MUST precede disinfection. Items and surfaces cannot be disinfected if they are not first cleaned of organic matter (patients' excretions, secretions, dirt, soil, etc). Potent disinfectants are not required to kill influenza viruses, common soaps and dilute household bleach are generally adequate.

Use cleaning methods that do not produce aerosols (e.g. use wet dusting methods instead of feather dusting) to mitigate any potential risk for virus transmission through direct inoculation (e.g. via inhalation or direct impact) into the respiratory (e.g. nose) or conjunctival mucosa. In healthcare settings, standard precautions are recommended for cleaning linen and laundry and managing clinical or nonclinical waste that may be contaminated with the highly pathogenic avian influenza virus.

What is the role of personal hygiene in responding to the threat of pandemic influenza?
To date, human infections with the avian influenza viruses detected since 1997 have not resulted in sustained human-to-human transmission. If the current avian influenza H5N1 virus changes to

produce a strain that is more transmissible among humans, it could signal the start of a pandemic. Strengthening personal hygiene practices to reduce human to human transmission will help stop or slow the spread of a pandemic virus.

Personal hygiene includes individual practices that serve to promote or preserve health such as habits of cleanliness. In the case of highly contagious diseases such as influenza, special attention should be paid to personal behaviour in community settings as well as the household. Public education, including public health messages, is an important part of national and local planning for pandemic influenza.

Should special personal hygiene precautions be taken in the home or at schools?
While WHO has guidance for issues such as personal hygiene, primarily for health-care workers, such guidance is based on general transmission patterns of seasonal human influenza. It is not known how effective this guidance would be in slowing the spread of a pandemic from a new virus strain.

However, there are basic good health habits that will help reduce the spread of influenza virus in the home or community settings. These include: Cleaning and disinfection of household surfaces likely to be contaminated by infectious secretions appears worthwhile. However, presently, there is no evidence to support the efficacy of widespread disinfection of the environment or air.

As part of pandemic influenza planning, special attention should be given to teaching staff, children, and their parents on how to limit the spread of infection. Programmes should already be teaching these things (e.g. use good hand washing; cover the mouth when coughing or sneezing; and clean toys frequently) to build habits that protect children from disease in general.

For further general information on avian influenza please refer to the specific pages on avian influenza on the Epidemic and Pandemic Alert and Response web site:
http://www.who.int/csr/disease/avian_influenza/en/index.html

Selected key documents
Avian influenza: protecting human health from farm to fork - video
An educational video dealing with the prevention aspects of avian incfluenza in humans through sensible precautions. http://www.who.int/foodsafety/publications/micro/ai_farmtofork/en/index.html
May 2006

Questions and answers: A selection of frequently asked questions on animals, food and water - executive version: http://www.who.int/foodsafety/micro/avian/en/index1.html
May 2006

INFOSAN Information Notes: Avian influenza in poultry and humans - food safety implications
The International Food Safety Authorities Network (INFOSAN: http://www.who.int/foodsafety/fs_management/infosan/en/index.html) is a global network of food safety authorities that disseminates important global food safety information and improves both national and international collaborations with a goal of preventing the international spread of contaminated food.
English: http://www.who.int/foodsafety/fs_management/No_04_AvianInfluenza_Aug06_en.pdf
French: http://www.who.int/foodsafety/fs_management/No_04_AvianInfluenza_Aug06_fr.pdf
Spanish: http://www.who.int/foodsafety/fs_management/No_04_AvianInfluenza_Aug06_sp.pdf
Chinese: http://www.who.int/foodsafety/fs_management/No_04_AvianInfluenza_Aug06_ch.pdf
Russian: http://www.who.int/foodsafety/fs_management/No_04_AvianInfluenza_Aug06_ru.pdf
Arabic: http://www.who.int/foodsafety/fs_management/No_04_AvianInfluenza_Aug06_ar.pdf
Successful strategies in controlling Avian Influenza
English: http://www.who.int/foodsafety/fs_management/No_07_AI_Nov05_en.pdf
French: http://www.who.int/foodsafety/fs_management/No_07_I_Nov05_fr.pdf
Spanish: http://www.who.int/foodsafety/fs_management/No_07_AI_Nov05_sp.pdf
Chinese: http://www.who.int/foodsafety/fs_management/No_07_AI_Nov05_ch.pdf
Russian: |http://www.who.int/foodsafety/fs_management/No_07_AI_Nov05_ru.pdf
Arabic: http://www.who.int/foodsafety/fs_management/No_07_AI_Nov05_ar.pdf
Vietnamese: http://www.who.int/foodsafety/fs_management/No_07_AI_Nov05_vietnamese.pdf

Highly pathogenic H5N1 avian influenza outbreaks in poultry and in humans: Food safety implications

English:http://www.who.int/foodsafety/fs_management/No_02_Avianinfluenza_Dec04_en.pdf
French:http://www.who.int/foodsafety/fs_management/No_02_Avianinfluenza_Dec04_fr.pdf
Spanish http://www.who.int/foodsafety/fs_management/No_02_Avianinfluenza_Dec04_sp.pdf

Prevention of foodborne disease: Five keys to safer food (January 2001)
http://www.who.int/foodsafety/consumer/5keys/en/index.html

Healthy food markets (April 2006)
http://www.who.int/foodsafety/capacity/healthy_marketplaces/en/index.html

Stop the Spread - Measures to Stop the Spread of Highly Pathogenic Bird Flu at its Source (3/2006)
http://www.wpro.who.int/NR/rdonlyres/07023609-F69A-4592-BFE2-77C3AC5FD446/0/StoptheSpread.pdf

Public Health Interventions for Prevention and Control of Avian Influenza: a manual for improving biosecurity in the food supply chain (March 2006)
http://www.searo.who.int/en/Section23/Section1001/Section1110_11528.htm

WHO/FAO/UNICEF adhoc meeting on behavioural interventions for avian influenza risk reduction Summary and recommendations (14-16 March 2006)
http://www.who.int/csr/disease/avian_influenza/adhocsummaryreport.pdf

For further general information on avian influenza please refer to the specific pages on avian influenza on the Epidemic and Pandemic Alert and Response web site:
http://www.who.int/csr/disease/avian_influenza/en/index.html

Other publications & links
Avian influenza and food safety: statement by Dr LEE Jong-Wook, WHO Director-General (27 2-06)
http://www.who.int/mediacentre/news/statements/2006/s04/en/index.html

Report of a FAO/OIE/WHO Consultation on avian influenza and human health: Risk reduction measures in producing, marketing and living with animals in Asia, Kuala Lumpur, 4-6 7/05 (1/06)
http://www.wpro.who.int/NR/rdonlyres/38A980D7-8577-400A-8024-7D27F34309D1/0/FAO_OIE_WHO_Consultation.pdf

Use of antiviral drugs in poultry, a threat to their effectiveness for the treatment of human avian influenza (11/11/05) http://www.who.int/foodsafety/micro/avian_antiviral/en/index.html

Avian influenza A(H5) in rural areas in Asia: food safety considerations (12 February 2004)
http://www.who.int/foodsafety/micro/avian2/en/index.html

Avian influenza A(H5N1) in humans and in poultry in Asia: food safety considerations (24/1/04)
http://www.who.int/foodsafety/micro/avian1/en/index.html

No bird flu risk for consumers from properly cooked poultry and eggs (5 December 2006)
English: http://www.who.int/mediacentre/news/releases/2005/pr66/en/index.html
Frenchhttp://www.who.int/mediacentre/news/releases/2005/pr66/fr/index.html
Spanishhttp://www.who.int/mediacentre/news/releases/2005/pr66/es/index.html
Arabichttp://www.who.int/mediacentre/news/releases/2005/pr66/ar/index.html
Chinesehttp://www.who.int/mediacentre/news/releases/2005/pr66/zh/index.html
Russia: http://www.who.int/mediacentre/news/releases/2005/pr66/ru/index.htmln

What Consumers Need to Know About Avian Influenza

U.S. Food and Drug Administration, March 29, 2004;Updated September 14, 2006 and October 19, 2006
Accessed: October 1, 2007: http://www.foodsafety.gov/~dms/avfluqa.html

General information about avian influenza (bird flu) as well as the highly pathogenic H5N1 avian influenza (HPAI H5N1) circulating in Asia, Europe, and Africa is available at the U.S. government's comprehensive Web site www.avianflu.gov.

1. **What is avian influenza?** Avian influenza (AI)--the bird flu--is a virus that infects wild birds (such as ducks, gulls, and shorebirds) and domestic poultry (such as chickens, turkeys, ducks, and geese). There is a flu for birds just as there is for humans and, as with people, some forms of the flu are worse than others.

   AI strains are divided into two groups based upon the ability of the virus to produce disease in poultry: low pathogenic avian influenza (LPAI) and highly pathogenic avian influenza (HPAI).

   LPAI, or "low path" avian influenza, naturally occurs in wild birds and can spread to domestic birds. In most cases it causes no signs of infection or only minor sickness in birds. These strains of the virus pose little threat to human health.

   HPAI, or "high path" avian influenza, is often fatal in chickens and turkeys. HPAI spreads more rapidly than LPAI and has a higher death rate in birds. HPAI H5N1 is the type rapidly spreading in some parts of the world.

2. **How is avian influenza spread?** AI is primarily spread by direct contact between healthy birds and infected birds, and through indirect contact with contaminated equipment and materials. The virus is excreted through the feces of infected birds and through secretions from the nose, mouth and eyes.

   Contact with infected fecal material is the most common of bird-to-bird transmission. Wild ducks often introduce LPAI into domestic flocks raised on range or in open flight pens through fecal contamination. Within a poultry house, transfer of an HPAI virus between birds also can occur via airborne secretions. The spread of avian influenza between poultry premises almost always follows the movement of contaminated people and equipment.

   AI also can be found on the outer surfaces of egg shells and in the case of HPAI, can infect the inside of the egg which includes the yolk and albumen or the egg white. Transfer to eggs is a potential means of AI transmission. Airborne transmission of virus from farm to farm is highly unlikely under usual circumstances.

   HPAI can be spread from birds to people as a result of extensive direct contact with infected birds. Broad concerns about public health relate to the potential for the HPAI virus, such as the HPAI H5N1, to mutate, or change into a form that could spread easily from person to person. The U.S. Department of Health and Human Services is aggressively working to ensure public health is protected.

3. **Can I get avian influenza from eating poultry or eggs?** AI is not transmissible by eating poultry or eggs that have been properly prepared. If HPAI were detected in the United States, the chance of infected poultry or eggs entering the food chain would be extremely low because of the

rapid onset of symptoms in poultry as well as the safeguards in place, which include testing of flocks, and Federal inspection programs.

Hens infected with HPAI usually stop laying eggs as one of the first signs of illness, and the few eggs that are laid by infected hens generally would not get through egg washing and grading because the shells are weak and misshapen. In addition, the flow of eggs from a facility is stopped at the first suspicion of an outbreak of HPAI without waiting for a confirmed diagnosis. Therefore, eggs in the marketplace are unlikely to be contaminated with HPAI.

Cooking poultry, eggs, and other poultry products to the proper temperature and preventing cross-contamination between raw and cooked food is the key to safety. You should follow the same handling practices that are recommended to prevent illness from common foodborne pathogens such as *Salmonella*:

- Wash hands with warm water and soap for at least 20 seconds before and after handling raw poultry and eggs.
- Clean cutting boards and other utensils with soap and hot water to keep raw poultry or eggs from contaminating other foods.
- Cutting boards may be sanitized by using a solution of 1 tablespoon chlorine bleach and 1 gallon of water;
- Cook poultry to an internal temperature of at least 165 degrees Fahrenheit. Consumers can cook poultry to a higher temperature for personal preference.
- Cook eggs until the yolks and whites are firm. Casseroles and other dishes containing eggs should be cooked to 160 degrees Fahrenheit.
- Use either shell eggs that have been treated to destroy Salmonella by pasteurization or another approved method, or pasteurized egg products for recipes that call for eggs that are raw or undercooked when the dish is served. Some examples of these kinds of dishes are Caesar salad dressing and homemade ice cream. Commercial mayonnaise, dressing, and sauces contain pasteurized eggs that are safe to eat. Treated shell eggs are available from a growing number of retailers and are clearly labeled. Pasteurized egg products are widely available.

For more information on the safety of handling eggs see: FDA/CFSAN Food Safety Facts for Consumers: Playing it Safe With Eggs. http://www.cfsan.fda.gov/~dms/fs-eggs.html

For more information about safe food handling and preparation:

- U.S. Food and Drug Administration (FDA) Food Information Line
  http://www.cfsan.fda.gov/~comm/oic-info.html
  1-888-SAFEFOOD (1-888-723-3366)
- U.S. Department of Agriculture (USDA) Meat and Poultry Hotline
  1-888 MPHotline (1-888 674-6854)
  The TTY number for the hearing impaired is (800) 256-7072.
- The Fight BAC! ® Web site: http://www.fightbac.org/

Potential Biological Agents

Disease/Causative Agent	Incubation Period[a] and Effect[b]	Symptoms	Vaccination and Treatment	Comments
Anti-Agricultural				
Foot and Mouth Disease (FMD) FMD virus	2 to 8 days	Fever, loss of appetite, and blisters in mouth and on feet	Vaccines are available. An outbreak would be contained by destruction of exposed animals	Highly contagious
Newcastle Disease (ND)/ ND virus	5 days	Loss of appetite, abnormal thirst, diarrhea, spasms.	Vaccines are available. An outbreak would be contained by destruction of exposed animals	Highly contagious
Rinderpest/ Rinderpest virus	3 to 5 days (lethal up to 90%)	Fever, nasal secretions, mouth lesions, bloody diarrhea.	Vaccines are available. An outbreak would be contained by destruction of exposed animals	Highly contagious
Anti-Personnel				
Botulism/ Botulinum toxin	12 to 36 hours; lethal	Double vision, slurred speech, difficulty swallowing, and paralysis. The greatest risk is respiratory failure.	Vaccine available. Verification required to treat respiratory failure.	Not contagious. Low-tech production method described in multiple open-source publica-tions. Difficult to product in large quantities.
Brucellosis/ Brucella species	5 to 60 days (10 to 100 organisms); incapacitant (lethal 5%); could also be used as antianimal agent.	Fever. Headache, muscle and joint pain, sweats, chills, malaise, and in 20% of cases there is chest pain and a cough.	No vaccine available. Treatment with doxycycline and rifampicin for 6 weeks.	Rarely contagious, though aerosols generated from cultures are infectious. Long and incapacitating disease.
Cholera/ Vibrio cholerae	2 to 3 days; inca-pacitant	Nausea, abdominal pain, and diarrhea. Fluid loss is the primary problem.	Vaccine available. Fluid replacement required, antibiotics recommended.	Rarely contagious, except through contact with feces. Easy to obtain.
Glanders/ Burkholderia mallei	10 to 14 days; lethal (>50%); could also be used as antianimal agent.	Fever, sweats, muscle pain, headache, chest pain, rash, swollen lymph nodes, and an enlarged spleen and liver.	No vaccine available. Treated with antibiotics – need to determine individual strain antibiotic sensitivities.	Low level contagion, though aerosols generated from cultures are infectious. Agent used against horses and mules in WW I by Germans. Rash could be mistaken for smallpox.
Inhalation anthrax/ Bacillus anthracis	1 to 6 days (8,000 to 50,000 spores); lethal	Fever, malaise, fatigue, shortness of breath.	Vaccine available. Treated with antibiotics.	Not contagious. Spore is very stable.
Pneumonic plague/Yersinia pestis	1 to 6 days (100 to 500 organisms); lethal (97 percent)	Fever, chills, headache, malaise, with a productive cough and bloody sputum, developing into pneumonia.	No vaccine available in US. Treated with tetracycline, choramphenicol or streptomycin.	Inhalation form is highly contagious and lethal.
Q fever/ Coxiella burnetii	12 to 21 days (1 to 10 organisms); incapacitant.	Fever, headache, fatigue, and muscular pain. May develop into pneumonia in 50% of patients.	A vaccine under investigation is available. Antibiotics will shorten the duration of the disease.	Rarely contagious. A single organism may produce clinical illness.

Disease/Causative Agent	Incubation Period[a] and Effect[b]	Symptoms	Vaccination and Treatment	Comments
Ricin	4 to 8 hours; lethal.	Inhalation – fever, cough, and fluid in the lungs; Ingestion – vomiting, diarrhea, fever and shock; Injection – pain, fever, vomiting, and bleeding.	No vaccine available. Ventilation required to treat respiratory failure.	Not contagious. Low-tech production method described in multiple open-source publications. Used in Bulgarian assassination plot in 1978.
Salmonellosis/ Salmonella species	6 to 72 hours; in-capacitant.	Nausea, abdominal pain, and diarrhea. Fluid loss is the primary problem.	Fluid replacement required.	Rarely contagious, except through contact with feces. Easy to obtain. Used in 1984 on food in Oregon by a US-based religious cult to influence an election.
Shigellosis/ Shigella species	12 hours to 1 week; incapacitant.	Nausea, abdominal pain, and diarrhea. Fluid loss is the primary problem.	Fluid replacement required, antibiotics recommended, although some multiple drug-resistant strains.	Rarely contagious, except through contact with feces. Easy to obtain.
Smallpox/Variola virus	1 to 17 days (100 organisms); lethal (30%).	Fever, malaise, chills, vomiting headache and rash.	Vaccine available in limited amounts. Antivirals under development may be useful	Highly contagious. Difficult to obtain; only 2 official stocks worldwide.
Tularemia/ Francisella tularensis	3 to 5 days (10 to 100 organisms); lethal (35% by in-halation exposure	Inhalation – fever, headache, malaise, chest pain, and a non-productive cough, with 80% developing pneumonia.	A vaccine under investigation is available. Treated with antibiotics.	Rarely contagious
Venezuelan equine encephalitis (VEE) Viral hemorrhagic Fe-ver/Congo-Crimean	1 to 6 days (10- to 100 organisms); incapacitant (lethal <1%).	Malaise, spiking fevers, chills, nausea, vomiting, sore throat and severe headache.	A vaccine under investigation is available. Antivirus under development may be useful.	Low level contagion
Hemorrhagic Fever (CCHF) virus	4 to 21 days; lethal	Fever, pain, shock, and mucous membrane bleeding.	No vaccine available. Supportive care required.	Moderately contagious
Viral hemorrhagic fe-ver/Ebola Virus	4 to 21 days; lethal (up to 90% for some strains).	Fever, pain, shock, and mucous membrane bleeding.	No vaccine available. Supportive care required.	Moderately contagious
Viral hemorrhagic fever/ Marburg virus	4 to 21 days; lethal	Fever, pain, shock, and mucous membrane bleeding.	No vaccine available. Supportive care required.	Moderately contagious

[a] Incubation period is the time from agent exposure to onset of symptoms: Infectious dose provided, if known.
[b] Incapacitant or lethal; percent lethality (in untreated cases) provided, if known.
National Counter-Terrorism Center, December 2004

Importing Meat, Poultry and Egg Products

U.S Department of Agriculture Food Safety and Inspection Service Import Inspection Division

The United States Department of Agriculture (USDA), through the Food Safety and Inspection Service (FSIS) ensures that domestic and imported meat, poultry and egg products are safe, wholesome, and accurately labeled.

FSIS Import Field Offices are staffed by an Import Field Supervisor and Assistant Supervisor, who manage nationwide inspection, surveillance, and liaison activities to ensure that imported meat, poultry, and egg products are safe, wholesome and meet all USDA-FSIS imported food standards. Each office covers a multi-state region that encompasses approximately one-fourth of the US: Detroit, MI: 248-968-0722, Los Angeles, CA: 909-369-9518, Miami Fl: 954-523-7669, and Philadelphia, PA: 215-597-4219 X130

FSIS Import Surveillance Liaison Officers (ISLO) are stationed at strategic ports of entry throughout the US, working with liaison officers and inspectors from the Department of Homeland Security/Customs and Border Protection (DHS-CBP), the USDA Animal and Plant Health Inspection Service (APHIS), and the Department of Health and Human Services/Food and Drug Administration (DHHS-FDA). ISLOs provide technical guidance and direction to customs brokers, animal products producers and shippers, and other businesses regarding import inspection methods, procedures, and regulatory requirements.

PRODUCTS SUBJECT TO FSIS IMPORT INSPECTION

Commercial shipment of meat, poultry and egg products imported into the US as human food must be inspected by FSIS. FSIS has authority over products produced from cattle, sheep, swine, goats, horse, mule, other equines, chickens, turkeys, ducks, geese, guineas, squabs, and ratites (ostriches, rheas and emus) as well as any dried egg, liquid egg or egg products, with or without added ingredients, including shell eggs intended for breaking or direct sale to consumers. Products prepared with relatively small proportions of meat or poultry are exempted from FSIS jurisdiction, but must be prepared with FSIS inspected meat/poultry or meat/poultry product from an inspection system equivalent to the FSIS system. Relatively small proportions include 3% or less raw meat/poultry; less than 2% cooked meat/poultry.

Imported products intended for commercial distribution must originate from countries eligible to export to the U.S. and must be produced in foreign establishments certified by the foreign government's inspection program.

Every shipment must be accompanied by an original health certificate from the originating country. The importer (or agent) must apply for import reinspection at a federally inspected import establishment prior to releasing meat, poultry, or egg products into commerce (FSIS Form 9540-1, *Import Inspection Application and Report* for all egg products). Shipping containers of product passing import reinspection are stamped "US Inspected and Passed" (exception: shipping containers of product imported from Canada are not stamped). Shipping containers of product not in compliance with US requirements are stamped "US Refused Entry."

ELIGIBLE COUNTRIES

For a list of countries and establishments eligible to import to the US, please consult FSIS website at: http//www.fsis.gov.usda.gov or contact FSIS Office of International Affairs, International Equivalence Staff, at 202-720-6400

Personal consumption shipments can originate from any country provided there are no animal health restrictions, as governed by the regulations of USDA-APHIS. Products intended for personal consumption are subject to inspection by the US Department of Homeland Security Agriculture Specialists upon arrival at the port of entry, and travelers are advised to contact APHIS prior to bringing product into the US. FSIS restricts personal consumption shipments to 50 pounds of meat, poultry, and dried egg products and less than 30 pounds of liquid or frozen egg products, which must accompany the traveler and cannot be resold or distributed. For information on animal health requirements, contact APHIS at 301-734-3277 or http://www.aphis.usda.gov. For information on traveler restricted products, contact DHS/CBP at 202-354-1000 or http://www.cbp.gov.

Sample shipments intended for laboratory examination, research, evaluative testing, or trade show exhibition must meet APHIS animal health requirements. Meat sample shipments should not exceed 220 pounds and must be accompanied by a health certificate issued by the exporting country's inspection service. Poultry shipments cannot exceed 50 pounds. A health certificate is not required for poultry. Egg product shipments cannot exceed 30 pounds for liquid or frozen eggs or 50 pounds for dried egg products unless otherwise authorized by FSIS. The importer must submit a *Notification of Intent* (FSIS Form 9540-5) to USDA-FSIS-IID in advance of the shipment. "Sample" shipments that are ultimately consumed by humans in any manner are considered "commercial" shipments and must be presented for reinspection by FSIS.

Undenatured inedible meat product intended for animal food. FSIS has jurisdiction over the entry of undenatured inedible meat and egg products. A permit number for shipping undenatured inedible meat products must be obtained from FSIS by contacting 1-202-720-9904. FSIS Form *9540-4, "Shipper Notification-Importation of Undenatured Inedible Meat Product,"* is required for each shipment of undenatured inedible product destined for the US. *Denatured inedible product* is regulated by FDA. Inedible poultry must be denatured.

U.S. Returned Products. "US Inspected and Passed" meat, poultry, and egg products exported from the United States may be returned to this country, provided these products meet APHIS animal health requirements. The owner/broker/agent must notify FSIS at 202-720-9904 or importinspection@fsis.usda.gov prior to these products entering the United States.;

Wild game meat and other products not amenable to FSIS. FDA has jurisdiction over other imported food commodities such as fish, bison, buffalo, rabbit, venison, wild game, and all other foods not covered by the Federal meat, poultry, and egg products inspection laws. FDA can be contacted at 888-463-6332 or http://ww.fda.gov. The Fish and Wildlife Service, which has jurisdiction over wildlife products, can be contacted at 703-358-1949 or http://www.le.fws.gov.

FSIS - Import Inspection Division- 1-202-720-9904, Importinspection@fsis.usda.gov

Rodent Snap Traps in Food-Handling Establishments

Richard C. Berman, BCE

The use of non-toxic, non-chemical rodent traps to remove rodents while sanitation and structural issues are being addressed is desirable and appropriate. 105 CMR 590.001 (State Sanitary Code Chapter X - Minimum Sanitation Standards For Food Establishments) adopts and incorporates by reference the 1999 Federal Food Code. Chapter 7 of the Code (dealing with poisons and toxic materials) does not address the use of mechanical rodent traps. Section 7-206.13 of the Code discusses the use of poison baits in bait stations. Poison baits must be contained in covered, tamper-resistant bait stations. The bait station is a box designed to protect the bait from becoming contaminated and unpalatable, as well as protecting the surrounding area and non-target organisms from poison exposure. The US Environmental Protection Agency regulates the Federal registration and use of rodenticides. USEPA considers bait stations to be tamper-resistant if they are capable of being locked and anchored, hands and fingers cannot reach the bait through the station's opening, the station is weather resistant and the box is sturdy enough not to be crushed by non-hoofed animals. Bait stations made of cardboard and thin plastic are not tamper-resistant and not appropriate for food establishment use.

333 CMR Section 13.08 (1)(f) (Massachusetts Pesticide Regulations) requires bait stations placed inside be labeled with the name and phone number of the company applying the rodenticide, brand name and EPA registration number, active ingredient and date of application. Section 13.08 was amended in February of 2007 by adding subsection (1)(c) that further requires that rodenticides placed in generally accessible areas of indoor settings must be placed in tamper-resistant bait stations and must be secured in place so as to prevent lifting and/or removal of these bait stations.

The Food Protection Program and Department of Public Health supports and encourages the use of Integrated Pest Management (IPM) and its principles. IPM is the holistic approach to controlling vermin that de-emphasizes the use of toxicants and emphasizes cleaning, maintenance, repair, physical exclusion and non-chemical controls. Mechanical rodent traps are important non-chemical tools that will often control a rodent problem, avoiding the use of poisons in the food facility.

It is inevitable that rodent traps such as multiple catch traps, snap traps and sticky glue traps will become contaminated from trapped animals. Such equipment should not be placed so it becomes a possible food contamination source. Excessively soiled traps should be cleaned or replaced, but if correctly placed do not need to be sterilized. If questions of rodent equipment use arise the permit holder and health agent are encouraged to speak with the rodent control, servicing company.

About the author: Richard Berman has practiced Integrated Pest Management in Massachusetts for 35 years and is Technical Director for Waltham Services. Berman is Board Certified by the Entomological Society of America and fills the commercial applicator seat on the Massachusetts Pesticide Board, helping make pesticide public policy and registering pesticides sold and used in the State.

Safe Handling Tips for Pet Foods and Treats

August 22, 2007
U. S. Food and Drug Administration, Consumer Health Information
http://www.fda.gov/consumer/updates/petfoodtips080307.html
Accessed: October 1, 2007

Consumers can take steps to help prevent foodborne illness, including *Salmonella* -related illness, when handling pet foods and treats. These products, like many other types of foods, can be susceptible to harmful bacterial contamination.

Salmonella in pet foods and treats can cause serious infections in dogs and cats, and in people too, especially children, older people, and those with compromised immune systems. *Salmonella* in pet foods and treats potentially can be transferred to people ingesting or handling the contaminated products.

FDA has stepped up its efforts to minimize the incidence of foodborne illness associated with pet foods and treats. Pet owners and consumers can also help reduce the likelihood of infection from contaminated pet foods and treats by following safe handling instructions:

Buying

- Purchase products in good condition, without signs of damage to the packaging such as dents or tears.

Preparation

- Wash your hands for 20 seconds with hot water and soap before and after handling pet foods and treats.
- Wash pet food bowls, dishes, and scooping utensils with soap and hot water after each use.
- Do not use the pet's feeding bowl as a scooping utensil—use a clean, dedicated scoop or spoon.
- Dispose of old or spoiled pet food products in a safe manner, such as in a securely tied plastic bag in a covered trash receptacle.

Storage

- Refrigerate promptly or discard any unused, leftover wet pet food. Refrigerators should be set at 40º F.
- Dry products should be stored in a cool, dry place - under 80ºF.
- If possible, store dry pet food in its original bag inside a clean, dedicated plastic container with a lid, keeping the top of the bag folded closed.
- Keep pets away from food storage and preparation areas.
- Keep pets away from garbage and household trash.

Raw Food Diets

FDA does not advocate a raw meat, poultry, or seafood diet for pets, but is stepping up its efforts to minimize the risk such foods pose to animal and human health. The agency understands that some people prefer to feed these types of diets to their pets.

For more information, including recommendations to protect both you and your pet when using raw meat, poultry, or seafood in the animal's diet, see http://www.fda.gov/cvm/foodbornetips.htm

Power Outages - Key Tips for Consumers about Food Safety

US Food and Drug Administration, Center for Food Safety and Applied Nutrition, May 19, 2006
http://www.cfsan.fda.gov/~dms/fsdisa6a.html Accessed: October 1, 2007

Be Prepared:

- Have a refrigerator thermometer.
- Know where you can get dry ice.
- Keep on hand a few days worth of ready-to-eat foods that do not require cooking or cooling, which depend on electricity.

When the Power Goes Out:

- Keep the refrigerator and freezer doors closed as much as possible.
- The refrigerator will keep food cold for about 4 hours if it is unopened.
- Refrigerators should be kept at 40° F or below for proper food storage.

Once the Power is Restored:

- Check the temperature inside of your refrigerator and freezer.
- If an appliance thermometer was kept in the freezer, check the temperature when the power comes back on. If the freezer thermometer reads 40° F or below, the food is safe and may be refrozen.
- If a thermometer has not been kept in the freezer, check each package of food to determine its safety. You can't rely on appearance or odor. If the food still contains ice crystals or is 40° F or below, it is safe to refreeze or cook.
- Refrigerated food should be safe as long as the power was out for no more than 4 hours. Keep the door closed as much as possible.
- Discard any perishable food (such as meat, poultry, fish, eggs or leftovers) that has been above 40° F for two hours or more.

For more information see: www.FoodSafety.gov - Consumer Advice: Disaster Assistance
http://www.foodsafety.gov/~fsg/fsgdisas.html

For more hurricane assistance, see
Health and Safety Before and After a Storm (FDA)
http://www.fda.gov/oc/opacom/hottopics/hurricane.html and
Disasters & Emergencies: Hurricanes (HHS). http://www.hhs.gov/disasters/

The Reporter

Joan L. Gancarski, Editor

Commonwealth of Massachusetts
Executive Office of Health and Human Services
Massachusetts Department of Public Health
Bureau of Environmental Health
Food Protection Program
305 South Street
Jamaica Plain, MA 02130
Phone 617-983-6712 Fax 617-983-6770 TTY 617-624-5286

www.mass.gov/dph/fpp

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